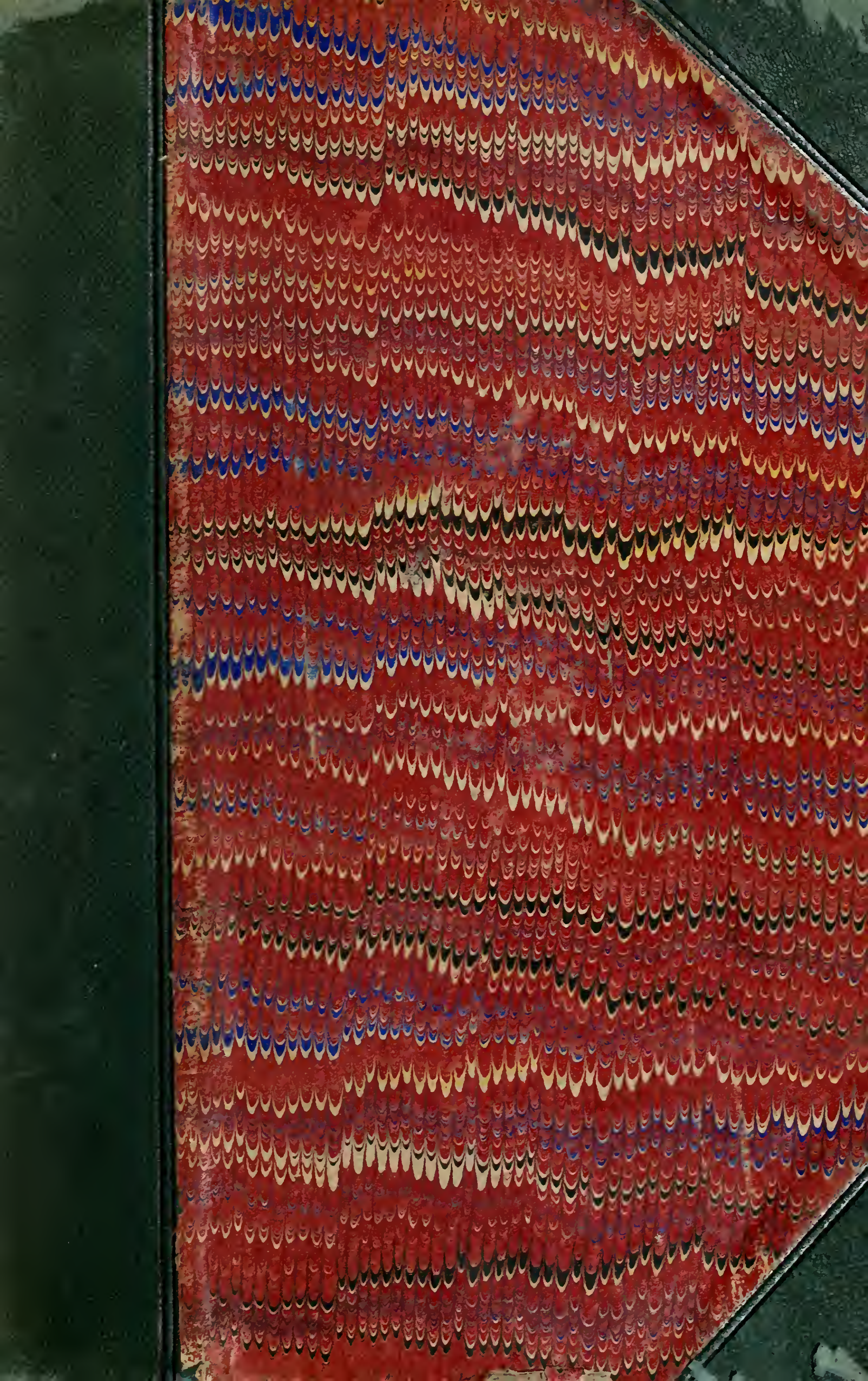

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ARCHIVES

OF

OTOLOGY

EDITED IN ENGLISH AND GERMAN

BY

DR. H. KNAPP
OF NEW YORK

DR. S. MOOS
OF HEIDELBERG

AND

DR. D. B. ST. JOHN ROOSA
OF NEW YORK

IN CONJUNCTION WITH

Dr. C. R. AGNEW, of New York; Prof. E. BERTHOLD, of Königsberg; Dr, G. BRUNNER, of Zurich; Dr. SWAN M. BURNETT, of Washington; Dr. J. PATTERSON CASSELS, of Glasgow; Dr. E. FRÄNKEL, of Hamburg; Dr. E. GRUENING, of New York; Dr. A. GUYE, of Amsterdam; Dr. A. HARTMANN, of Berlin; Dr. C. J. KIPP, of Newark; Dr. B. LOEWENBERG, of Paris; Prof. E. DE ROSSI, of Rome; Dr. G. SAPOLINI, of Milan; Dr. JAS. A. SPALDING, of Portland, Me.; Dr. H. STEINBRÜGGE, of Heidelberg; Dr. O. WOLF, of Frankfort-on-the-Main; Prof. R. WREDEN, of St. Petersburg; and many others.

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VOL. XI. No. 1.

ARCHIVES OF OTOLOGY.

ON THE COMBINED OCCURRENCE OF RACHITIC ALTERATIONS AND DISTURBANCES OF DEVELOPMENT IN THE EARS OF A CRÉTIN.

By Prof. S. MOOS and Dr. H. STEINBRÜGGE, of Heidelberg.

(*With one wood-cut.*)

Translated by James A. Spalding, M.D., Portland, Me.

A MAN who had been picked up in a miserable and sickly condition in the streets of Heidelberg, died in the jail a few days later, April 3, 1881. He was of middle age, short, and stoutly built, and looked like a crétin. He is also reported to have been a deaf-mute.

The *post-mortem* examination at Dr. J. Arnold's pathological institute revealed the following condition:

Rigor mortis well marked. The skin is covered with numerous excoriations and scabs. The posterior surface of the right shoulder is swollen as big as one's fist. The overlying skin is also reddened, and fluctuates distinctly to the touch. Beneath this swelling lies a large pus cavity, at the bottom of which the muscles are infiltrated with pus. The scapula has undergone extensive carious destruction.

The condition of the organs of the chest and abdomen is omitted as unnecessary to our purpose.

The calvarium is thick, firm, and hyperostotic. The longitudinal sinus is filled with fluid blood, and the pia mater over the great hemispheres swollen and deeply infiltrated with serum. The cerebral convolutions are flattened. The lateral ventricle is considerably enlarged, and filled with a clear fluid. The ependyma is very granular; the substance of the brain, coarse and moist.

Anatomical diagnosis: caries of right scapula, purulent infiltration of the soft parts. Bronchial ectasia, emphysema of the lungs, chronic leptomeningitis, and hydrocephalus internus. Hyperostosis of the cranium.

MACROSCOPIC EXAMINATION OF THE PETROUS BONES.

The squamous portion adjoining the petrous bone is sclerosed and thickened, measuring at several places 1 *cm.* Both mastoid processes are sclerosed, both petroso-squamous sutures well marked despite the hyperostosis.

Right Petrous Bone.

The ext. aud. meatus and *Mt* are normal, excepting the angle which the latter makes with the inferior wall of the meatus, *viz.:* 51°[1]

The osseous tube is contracted. The measurements of the tympanum are as follows: Upright diameter 9 *mm.*, diameter of the roof 8 *mm.*, of the floor 5 *mm.* The mucous membrane on the floor of the tympanum and at the approach to the round window is thickened, while the latter is closed by a connective-tissue membrane. The promontory is very flat, its thickness from the anterior wall to the scala tympani measuring only 3–4 *mm.* The posterior wall of the tympanum in the region of the descending part of the facial nerve is sclerosed and hardened, while the Fallopian canal, at more than one spot, is nothing more than a gutter covered with periosteum, as in animals. The antrum is contracted. The malleo-incudal articulation on this side is normal. The condition of the stapes will be mentioned further along. The intrinsic muscles are unaltered.

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[1] Inasmuch as we cannot apply a quadrant to the *Mt* for the purpose of measuring its angles (v. Troeltsch), we have resorted to the following method: The outer halves of the osseous meatus are sawn off, and the internal space filled with liquid paraffine. After the latter has hardened, the tendon of the tensor tympani and the incudo-stapedial articulation are divided, and the lateral portion of the petrous bone separated from the medial portion in such a manner that on pushing a blunt instrument through a small artificial opening on the inner surface of the inferior periphery of the *Mt*, the hardened mass of paraffine can be pushed out *in toto.* We can, from this cast, determine the angles of the *Mt* in the most accurate manner possible.

Left Petrous Bone.

The ext. aud. meatus is normal; the inferior angle of the *Mt* 89°. The osseous tube is wider, the tympanum more spacious, and the promontory more projecting than on the right side. The floor of the tympanum is 6 *mm.* broad. The entrance to the round window is contracted. The malleo-incudal and incudo-tympanic articulations are anchylosed. The facial canal offers the same anomaly as on the right side.

MICROSCOPIC EXAMINATION.

After treating both temporal bones for two days with a 2-per-cent. solution of osmic acid, the bony tissues became decalcified.

Right Petrous Bone.

While making a section at the posterior margin of the oval window, and vertical to the longitudinal axis of the pyramid, we came, as often before noticed, upon a hard, yellow, osseous nucleus, which could not be divided until we struck a sharp blow upon the back of the knife blade. It measured longitudinally 6 *mm.*; it was 1½–5 *mm.* broad. It embraced the ampullar end of the horizontal and posterior semicircular canals.

The membrane of the round window is preserved; the orifice of the latter is narrowed and filled with connective tissue, the meshes of which contain numerous fat-globules, tinted black by the osmic acid.

The space between the limbs of the stapes is filled with connective tissue. A cross-section of the limbs shows that they do not consist of solid bone, but are hollow, the concavity being filled with delicate connective tissue, provided with small round cells and a few vessels. The depth of the niche in which the oval window lies is 3½ *mm.* The plate of the stapes is 2 *mm.* long. The stapes ligament is ossified.

The bony capsule of the cochlea, near the recessus hemisphericus, includes an extensive district, whose histological structure is quite noteworthy, in so far as it lacks the essential attributes of organized bone. It consists chiefly of cartilaginous cells, interspersed with a few darker clusters of granules (molecular crumbs of lime). A few filamentous cones, some brighter, some darker, precisely like those which Virchow[1] has observed and depicted in rachitic bones, run in various directions toward the recessus hemi-ellipticus.

The blood-vessels of the entire labyrinth are normal, but extremely congested.

The modiolus of the cochlea contains a large amount of granular brown pigment, lying partly in cells, and partly in the lymph-tracts.

Although our method of examination particularly favors the coagulation of lymph in the labyrinth, the almost total occlusion of the canals of the cochlea by a yellowish, firmly coagulated, lymph-like substance, as well as the intimate connection of the latter with the membrana tectoria, was exceedingly remarkable. The scalæ of the cochlea were abnormally and irregularly curved and inclined to be angular. The microscopic condition of the auditory nerve will be described in speaking of the left temporal bone.

The left temporal bone contains a bony nucleus like the right.

The entrance to the round window is very narrow, only ½ *mm.* in diameter. The structure of the occluding mass is similar to that on the right side.

The niche in which the oval window lies is still deeper than on the right side. The plate of the stapes has disappeared, its position being occupied by bony tissue, which extends uninterruptedly into the wall of the vestibule.

The limbs and head of the stapes have given way to a cone or slipper-shaped body with a bony periphery and a central portion composed of connective tissue, fat, and small round cells.

Explanation of the adjoining figure.—It represents a section vertical to the longitudinal axis of the temporal bone, continued through the middle of the left stapes and the adjacent labyrinthine wall (Hartnack $\frac{2}{2}$). To the left and upward we see the section of the facial nerve, with its open gutter to the right and downward. The stunted stapes is attached to the various portions of its niche by bands and connective-tissue fibres. The large and nearly empty cavity in the drawing was filled with small cells, etc., directly after preparing the specimen (compare text), but they fell out before the drawing was made. There does not seem to be any thing which bears the least resemblance either to the ligaments or to the plate of the stapes. The rest of the description is contained in the text. Besides this, the whole space occupied by the stapes is crossed by numerous band-like fibres which extend from the bony periphery of the before-mentioned cone to the mucous membrane which lines the various portions of the niche, so that in this way the stapes which has undergone such extraordinary alterations is closely united with the neighboring region. These bands possessed a fibrillar structure, and were interspersed with oval cells having a single nucleus.

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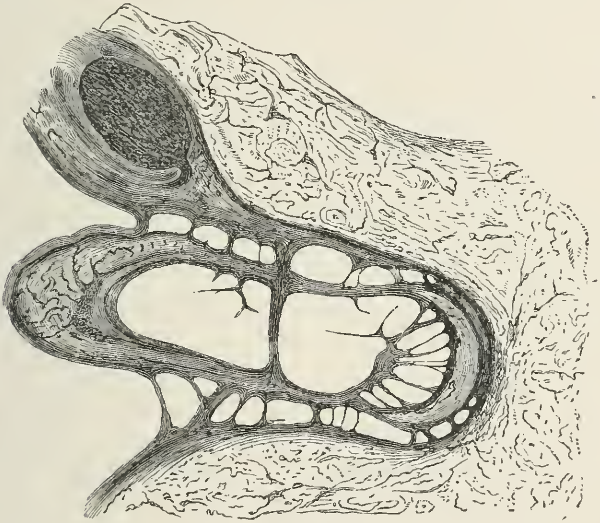
[1] "Cellular Pathology."



The entrance of the porus acusticus is contracted and horizontally oval: its longer diameter measuring 4 *mm*, its shorter diameter 2 *mm*.

The left pyramid also contained a bony nucleus in the same position and of about the same size as that on the right side, as well as the same sort of yellow, fibrinous coagulum in both scalæ of the cochlea.

Both auditory nerves exhibited about the same structure within the porus acusticus. The ganglionic cells were full of pigment. The fibres were of a sepia tinge, partially broken up into tænia-like members with remarkably smooth and regular lines of demarcation, and axis-cylinders which were distinctly visible although exceedingly minute. Many of these fibres still contain the members, just described, in complete contact (Engelmann), while the distinct transverse lines probably exhibit those spots which Ranvier regards as knots in the nerves.

After the police authorities had discovered the personality and residence of the deceased, we sent the following questions to the burgomaster of the town. These questions and their answers are here appended:

Ques. Was K. only dumb, *i. e.*, without the gift of speech, or was he both deaf and dumb?

Ans. K. was dumb, and his hearing was very poor.

Ques. Was he *totally* deaf, or could he still hear a few words, or music, or noises?

Ans. He could still hear.

Ques. Was he born deaf, or did he acquire his deafness?

Ans. He was born deaf.

Ques. In the latter case, did he go to school when a boy, and if so did he learn any thing while there?

Ans. He could only go to school for a short time, as the teacher sent him away.

Ques. Did he suffer from any severe diseases in childhood? if so, name them.

Ans. He was sickly from childhood. The diseases from which he suffered are unknown.

Conjectural origin of the anatomical alterations.

The anatomical alterations of the temporal bones as above described were evidently both congenital and acquired.

Amongst the congenital alterations we may classify:

(*a*) *On the right side;* the imperfect ossification of the limbs of the stapes (cavity).

(*b*) *On the left side;* the absence of the plate of the stapes, the low stage of development of that bone (club-like structure of which only the periphery was ossified[1]) as well as the imperfect ossification of the facial canal on both sides. Amongst the *acquired alterations* we may include the distinct hyperostosis on both sides at the inner (labyrinthine) and posterior walls of the tympanum, the greater depth of the entrances to the labyrinthine windows thus caused, the noticeable contraction of the internal auditory meatus, the thickened and angular condition of the scalæ of the cochlea, the constriction of the entrances to the round windows, and, finally, the transformation (on the right side only) of the ligamentum annulare into osseous substance.

It is very probable that all of these conditions depend upon various irritative processes, at an early age, in the pyramids of the temporal bone. In addition to those already mentioned we classify as *particular* alterations, the region close to the right recessus hemisphericus (consisting of cartilaginous cells and clusters of granules instead of bone) as well as the filamentous cones which extend toward the right recessus hemiellipticus in various directions (compare antea). The latter alterations are evidently due to some *rachitic process.*

Finally, we do not at all conceal from ourselves the difficulty which lies before us in differentiating these alterations according to their origin, and we are quite willing to accept the objection that some of those which we have regarded as *acquired* may possibly be attributed to a disturbance in development.

Inasmuch as the question of the development of the stapes is not yet settled (compare Kölliker *ubi supra*) we will not add any further suppositions concerning the condition of this bone. To judge from our case, however, it would appear somewhat more probable that the stapes is developed from some projection of the labyrinthine wall (Parker and Gruber).

We meet with great difficulties in endeavoring to harmonize the functional disturbances (the actual condition of which is based upon the inadequate data of a layman) with the anatomical alterations.

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[1] Compare Kölliker: *Entwickelungsgeschichte*, 2te *Aufl.*, p. 478, where he says: "The human stapes is originally a round, club-like body, which later becomes perforated by absorption and gradually obtains its typical form."

The numerous experimental investigations which we have made concerning the amount of hearing in cases of congenital occlusion of both auditory meatus, lead us to adopt the opinion (in opposition to Knapp) that *qualitative sensations of sound are perceived by bone-conduction alone.*

Although the patient was dumb, the alterations in the brain and its membranes do not necessarily presuppose absolute deafness. "He could still hear." It is indeed much more plausible to assume that sounds were perceived, even though imperfectly, by bone-conduction. For although the ligamentum annulare on the right side had undergone ossification, and the plate of the stapes on the left had disappeared, nevertheless the condition of the round window would certainly have permitted the labyrinthine fluid to vibrate. If we do not accept some such view as this, then the nearly normal condition of the membranous labyrinth, as well as of the fibres of the auditory nerve in the internal auditory meatus and in its terminal filaments, must seem enigmatical when viewed in the light of general pathology. Or even if we agree that the atrophy of the nerves from non-use advances but slowly, the entirely negative condition of the nerve in this respect would make it impossible for us to explain this case unless we resorted to some such view of the value of bone-conduction as we have just expressed because the patient had reached middle age.

The angles of the membrana tympani deserve still further mention. The inferior angle on the right side measured 51°, on the left, 89°. The extraordinary difference of 40° indicates an irregular development of the cranium.[1] V. Troeltsch gives the normal superior angle as 140°; the inferior would therefore measure about 40°. Hence in our case the inferior angle on the right side measured 10°, and on the left 50° more than the normal. It is of course quite possible that this condition depended upon an abnormal development of the cranium, but unfortunately we are unable to prove any thing definite in this respect.

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[1] R. Virchow: Gesam. Abhandlungen zur wiss. Med., p. 891. "Ueber den Cretinismus, etc., und über pathol. Schädelform."

HYPEROSTOSIS AND EXOSTOSIS: ANCHYLOSIS OF THE HEAD OF THE HAMMER, BONY OCCLUSION OF THE ROUND WINDOW, AND COLLOID DEGENERATION OF THE AUDITORY NERVE IN THE PETROUS BONE OF AN AGED LUNATIC AFFECTED WITH HALLUCINATIONS.

By Drs. S. MOOS and H. STEINBRÜGGE, of Heidelberg.

Translated by James A. Spalding, M.D., Portland, Me.

THE following specimen preserved in alcohol was taken from a woman aged 80, who died in the prebendary house at Basel.

History.—Madam G. was at first only affected with hallucinations, accompanied with very active subjective sensations of light and sound. Otherwise her psychical life was normal. It was not until a later date that the other senses became affected, that the patient suffered from delusions, and finally went crazy. The hearing was never but slightly diminished. The disturbances of the senses were first noticed in 1875, then ceased for a few months, reappeared in 1876, and persisted until the patient's death, May 5, 1880.

Autopsy.—Anatomical diagnosis: nephritis chron. interstitialis, emphysema, chronic bronchitis, hypertrophy of the heart, fatty degeneration of the right ventricle. Hydropsy.

The cranial cavity is symmetrical, narrow, short, and high; dura mater adherent to the calvarium. Much bloody fluid escapes while removing the brain.

The pia mater is œdematous and milky-looking; the carotids extremely calcified, as well as the basilary artery at its point of division. The same condition is seen in the left vertebral artery.

The right lateral ventricle is moderately enlarged, and contains a pale fluid. The brain is coarse, and its gray substance atrophic ; the white substance full of hemorrhagic specks. The left lateral ventricle is also enlarged ; ependyma on both sides thickened.

The middle ventricle is enlarged, lateral plexuses pale-red, and crowded with transparent cysts as large as a bean. The right central ganglia contain a few small brownish patches of softening ; both lower cornua dilated.

Miliary aneurisms in the pia mater on both sides. Weight of brain 1130 grammes.

As the temporal bone had already been lying in alcohol for a long time, we examined it without using any reagents, and before decalcification had been caused.

Condition.—The dura mater is everywhere adherent, the whole temporal bone hyperostotic. The posterior surface of the pyramid, as well as the base of the anterior surface, exhibits little nodules of ossification. The *posterior surface* of the bone offers two remarkable points : first, the orifice for the passage of the vagus, glosso-pharyngeal, and accessory nerves, which normally is only separated from the jugular vein by a tip of the dura mater, is here divided from the vein by a bony bridge which is 5 *mm.* wide ;[1] secondly, a smooth triangular exostosis extends from the aperture of the aqueductus vestibuli to the medial edge of the porus acusticus internus, which has become contracted into a slit-shaped orifice. The base of the triangle lies near the superior petrosal sinus, and measures 2.7 *cm.* It projects above the porus acusticus internus in the shape of a club, from the summit of which springs a small bony spur, which in turn rises above the internal auditory meatus. The summit of this pyramidal exostosis, the lateral limb of which measures 2.2 *cm.*, the medial limb 2.1 *cm.*, reaches as far as the above-mentioned bony bridge, between the entrances of the nerves and vessel. The eminentia arcuata juts forward considerably. From its centre springs a ridge-like exostosis, which stretches to the squamous portion of the temporal bone. The hyperostosis has narrowed the calibre of all the bony sinuses.

---

[1] Hauerwaas, *Monats. f. Ohr.*, 1880, No. 5 : Scheinbare Trennung des Foram. Jugul. durch einen Knochenkamm, etc.

The external auditory meatus is very much contracted by the protrusion of its anterior bony wall. The inferior angle of the *Mt* measures 82°. The circumference of the *annulus tympanicus* is extremely hyperostotic: the head of the hammer is anchylosed with the lateral and superior wall of the tympanum. We cannot give any definite information concerning the condition of the anvil, since it was dislocated while preparing the specimen. The articulation between the stapes and vestibule is movable: processus cochleariformis highly developed, mucous surface of *Mt* discolored, mucous membrane of the tympanum thickened. The floor of the tympanum is thickened by several *mm* (sclerosis). The bony tube and ostium tympanicum are extraordinarily narrow; round window occluded with bone. A transverse section of the pyramid shows that it has undergone ivory-like sclerosis throughout. The modiolus of the cochlea near the first convolution is 3 *mm* thick in transverse diameter, while the intermediate walls of the cochlear capsule are very thick and hard. The facial canal is narrow and the nerve itself thin, but special inquiry showed that the patient had never suffered from irritation or paralysis in the region to which this nerve is distributed. In point of fact the nerve appeared normal under the microscope, while on the contrary the *nerve fibres of the auditory nerve had undergone colloid degeneration.* It is unfortunate that we cannot give any trustworthy information concerning the membranous structures of the labyrinth, owing to their protracted preservation in alcohol.

Origin of the alterations in the temporal bone.

These may justifiably be referred to the extension of the chronic inflammatory processes in the calvarium and dura mater. It is probable that the morbid process had existed for years, since the excessive sclerosis of bone can be traced even into the central portions of the petrous bone, the modiolus, and the scalæ of the cochlea. Further alterations in the temporal bone, which we will here pass over in silence, may be regarded as secondary symptoms of the pathological process in the cranium.

Connection between the functional disturbances and the pathologico-anatomical conditions.

The clinical history does not mention any precise determination of the amount of hearing. Still, we are justified in believing that the sentence "hearing itself was but slightly diminished," referred simply to the right ear. The left ear must have been totally deaf; the deafness being undoubtedly dependent on anchylosis of the head of the hammer, bony occlusion of the round window, or finally upon the colloid degeneration of the auditory nerve.

We have the right to refer the hallucinations of hearing to some central disturbance, especially when we recall this condition of the auditory nerve. If we were inclined to adopt the opinion that the peripheral alterations might have caused the subjective sensations of sound, and these, in turn, the hallucinations of hearing, with the assistance of a deranged brain, we must nevertheless remember that the hallucinations continued to the end of life, while the colloid degeneration of the nerves must surely have originated long before death, so that a peripheral irritation could not possibly have been conducted to the central organ.

We will simply remark, *concerning the magnitude of the angle of the membrana tympani*, that as it measured nearly 90°, we can exclude an early development of the alterations in the cranium and petrous bone. Otherwise the angle would undoubtedly have been a great deal smaller.

A CASE OF DOUBLE LABYRINTHINE AFFECTION, WITH STAGGERING GAIT AND PERMANENT ABOLITION OF HEARING AFTER MUMPS.

By Dr. S. MOOS, Heidelberg.

Translated by James A. Spalding, M.D., Portland, Me.

THOSE interesting cases of affection of the ear after mumps, which were lately reported and discussed at the meeting of the American Otological Society,[1] have led me to publish the following account of a similar case which recently came under my observation.

W. S., æt. 13, consulted me May 10, 1881. His father said that the boy had been affected for ten days in the previous February with double parotitis, which was at that time epidemic in the neighborhood. Hearing was totally destroyed on the fifth day ; vomiting set in on the sixth day ; and on the eighth, on leaving his bed, the boy staggered as he walked. The latter symptom gradually disappeared. The patient never lost consciousness. A course of iodide potass.—20 grammes in all—had been of no avail. We advised further use of this remedy, and a visit to some watering-place. We never saw the case again. The right *Mt* was somewhat more opaque than normal ; the left more concave than the right.

The patient had entirely lost his perception of speech. He seemed to have perception by bone-conduction (in the right ear) of the tuning-forks *C* and *C′* ; *A′* not heard. There was no perception at all in the left ear, even by bone-conduction.

If metastasis into other organs had never been observed in cases of mumps, we might easily be induced to imagine that the inflammation was propagated directly from the parotid to the organ of hearing, although along a path of which we are still in ignorance. Nevertheless, in reflecting upon the fact that, *e. g.*, *both* testicles are occasionally affected in mumps, it may be quite possible that, in many cases of parotitis, various substances enter the circulation and give rise to obstructions and secondary disturbances in organs, such as the testicles or labyrinth, with complicated circulatory apparatus, particularly when the escape of blood is in any way hindered. The fact that the patient did not lose consciousness during the whole course of the disease proves that this was not a case of basilar meningitis, but simply an affection of the labyrinth.

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[1] These Archives, x, 274.

The other functional disturbances, viz., the staggering gait and the total deafness, can be most easily explained by a double labyrinthine affection. If the boy estimated the perception of the tuning-forks correctly, we might assent to the opinion that some of the fibres in the right cochlea (those at least which serve for the perception of deep tones) were not totally destroyed by the disease in question.

A CASE OF DIPLACUSIS.

By Dr. H. STEINBRÜGGE, of Heidelberg.

Translated by James A. Spalding, M.D., Portland, Me.

THE case now before us offers nothing new, but may possess some interest, owing to the fact that the patient was very musical, so that his observations are to be regarded as entirely trustworthy. If the following account does not seem sufficiently full, I would simply say that the patient was seen only once.

Oct. 20, 1881. Mr. H. W., æt. 52, consulted me for a purulent discharge from his left ear, which had lasted since his childhood. He was not sure whether his right ear had ever suppurated or not, but he had a faint recollection of an "ulcer" in this ear, from which blood and pus were evacuated. He had long since totally lost his hearing on the left side, although it had always been quite satisfactory on the right until lately, when he suffered from occasional colds, during the continuance of which his hearing decreased very noticeably.

One evening in March, 1881, the patient felt in fine spirits, and was humming a song to himself, when he suddenly noticed that he seemed to be singing a duet. He heard the true tone, as well as the major third above. He was not sure upon which side he heard the higher tone, nor could he accurately define the number of octaves which were affected with the double hearing. This condition persisted for some time, when all varieties of music created so great a dissonance in his ears, that he was forced to deprive himself of all his former enjoyments of that sort. At the same time he suffered from subjective noises (hissing, seething of a steam-boiler), and had several attacks of vertigo, during which he staggered to and fro, as if he had been drunk. He thought that the vertigo was due to some gastric disturbance, since it was accompanied with eructation and occasional vomiting.

During the last month the perception of tones has again become pure, while the vertigo has entirely disappeared. Last evening the patient thoroughly enjoyed an opera from beginning to end; all the tones seemed pure, and both high and low tones could be heard with equal clearness.

Examination of the left ear showed a round central perforation of the *Mt*, into which the tip of the handle of the hammer projected. The rest of the membrane was thickened as usual, and of a grayish-red tinge. The secretion, if any, was very slight. The right auditory meatus could not be thoroughly examined, owing to the presence of a firmly clinging bit of cerumen, which the patient declined to have removed. Nevertheless, a cicatrix could be seen in the posterior portion of the *Mt*, and a calcareous concretion in the anterior portion.

H, *loud voice*, Right, 1–1.5 M ; Left, 0.
H, *loud-ticking watch*, Right, 0.02 M ; Left, 0.

The tuning-forks C and C were perceived *on the right side only*. I had, at the time, no higher tuning-forks or other instruments for properly testing high tones. Still, it is hardly probable, judging from the other tests, that even these would have given any different results.

After Politzer: H, *loud v* Right, 5 M ; Left, 0. The mucous membrane of the naso-pharynx was thickened and reddened, and the patient complained of frequent attacks of coughing and cold in his head.

To conclude: the left ear was completely deaf for aërial and bone-conduction. In the right ear, if we pass over in silence the traces of a former purulent inflammation of the middle ear, the deafness which had of late been on the increase could undoubtedly be referred to catarrhal contraction of the tubes from chronic naso-pharyngeal catarrh, because the entrance of air produced an immediate and decided improvement of hearing. This fact would tend to demonstrate that the right labyrinth was intact.

If we take Helmholtz' theory as our starting-point in the interpretation of this case, there can be no doubt that in March the *left* labyrinth was attacked with an inflammation which affected the cochlea as well as the region to which the ramus vestibuli is distributed. The inflammatory processes in the cochlea caused at first a symmetrical lowering of pitch throughout a large portion of the zona pectinata. When, therefore, a tone was struck, it was not a fibre symmetrical to one in the zona of the right cochlea which was set into simultaneous vibration, but a shorter string (lying nearer the round window) which had become attuned a third lower by the inflammatory lowering of pitch, whereby again a nerve fibre accustomed to the perception of a *higher* tone was excited into vibration, instead of the nerve fibre symmetrical to that in the healthy ear. *Hence the major third was heard in the left ear.* At a later date, owing to the symmetrical lowering of pitch in the zona pectinata, this organ or the organs of Corti must have undergone a greater disorganization, since all tones sounded discordant, and the sound of music became intolerable to the patient. The subjective noise was of course due to the irritative condition of the left ramus cochleæ.

The inflammatory irritation of the ramus vestibuli in the vestibule and ampullæ expressed itself in the attacks of vertigo, and, secondly, by eructation and vomiting.

The *apparent* recovery depends, in all probability, upon destruction of the conductive capacity of the left auditory nerve, or of its terminal branches within the labyrinth, by some insidious chronic inflammation. The opera was undoubtedy enjoyed by the right ear alone, as is evident from the tests of hearing.

It may appear extremely doubtful whether the cessation of the vertigo and vomiting depended upon complete restoration of the structures supplied by the ramus vestibuli, or upon paresis or even destruction of this nervous terminal organ, so that even *the persistence of the inflammation in the ampullæ or semicircular canals was no longer perceived by the central organ.* The latter view seems the more probable, when we consider the intimate connections of the various subdivisions of the labyrinth, as well as from analogy with other cases. Hence, this case cannot be regarded as the "*cessation*," to say nothing of the "*cure*" of a labyrinthine affection. All that we can therefore do for the patient, is to advise careful dietetic rules and protection of the *right ear*, for which latter purpose we resort to the usual treatment of chronic naso-pharyngeal catarrh, and to the use of the air douche three times a week.

CONGENITAL FIBROUS CLOSURE OF THE MEATUS. OPENING FRUSTRATED BY AUDITORY HÆMATOPHILIA.

By H. KNAPP.

CONGENITAL closure of the entire external ear canal by soft tissue is, so far as my experience goes, rarer than bony closure. A well-marked case of that kind came under my care last autumn, and seemed to offer excellent chances for the restoration of the canal, but the attempt failed on account of a marked hemorrhagic diathesis of the patient. As the blood pervaded the whole parotid region and a part of the neck, I thought a report of the case might not be without interest.

Mrs. M. M., æt. 23, of Omaha, consulted me Oct. 17, 1881. Her hearing had been tolerably good until five months previously, when she poured cold water over her forehead and head, and in the night became almost totally deaf, suffering from pain and buzzing in the head, dizziness, nausea, vomiting, and uncertainty in walking. The cerebral symptoms lasted a week, the buzzing four weeks, the hearing returned gradually ; she menstruated at the proper time, three days after the attack.

When she came to me, I found her a healthy-looking, robust woman. She suffered, however, from dysmenorrhœa, and had no children, though she had been married several years. She was subject to colds, her tonsils were swollen, and the posterior wall of the pharynx was partially cicatricial.

Both auricles were well developed. The right auditory canal was normal, the left completely closed, its orifice indicated by a shallow depression, which, when pressed upon with a probe, gave the resistance of soft tissue, not of bone. The right membrana tympani was dull and somewhat sunken, white at the periphery ; $h\ \frac{1}{\infty}$, bone-conduction good, $V\ \frac{15}{60}$, on both sides. On the left side the tick of the watch was more distinctly heard from the mastoid process than from the ear. The tick appeared louder, both from the auricle and the mastoid of the left ear, when the right ear was held closed, than when it was open. The tuning-fork was heard evenly when passed up and down before the left ear, but in puffs when moved before the right ; placed on the forehead between the eyebrows it was heard better on the left side than on the right, even when the right ear was held shut, whereas pressure on the left closed meatus made no difference.

Inflation by Politzer's method was felt in the left ear, not in the right ; inflation with the catheter in the right ear, during the act of swallowing only, in the left also when the tubal muscles were at rest.

I treated her for nine days, and examined her repeatedly. Her hearing was raised to $V\ \frac{20}{60}$ on either side ; otherwise the conditions of both ears remained unchanged.

From the positive result of inflation through the left E. tube, and the good hearing power on the left side, which was not diminished when the right ear was held closed, I inferred that the left tympanic cavity and drum-head must be well developed, and that the innermost portion of the external ear canal might, perhaps, also be open. I, therefore, asked the patient to let me try to restore the left ear canal. She gladly consented. On Oct. 26th I thrust a narrow-bladed knife (Graefe's cataract knife) one inch deep into the soft tissue which filled the canal. I felt no bony resistance at the point, but felt it well on the side when, in withdrawing the knife, I enlarged the wound. The moderate bleeding showing no tendency to stop spontaneously, I inserted into the wound a perforated silver tube of 3 *cm* in length, and 3 *mm* in thickness, and put a pad of absorbent cotton over its external end. The wound discharged a sanguinolent fluid for the next 24 hours. When the dressing and tube were removed, it bled freely again. The surrounding parts were swollen, but not tender to the touch. A new tube was inserted. On the third day the condition was the same, only the swollen parts were suffused with blood. Patient felt well, however. In the evening she went out, and in the night she had considerable pain in the ear. When she came to me on the fourth day, I found the discharge bloody and slightly offensive, the whole pre-auricular and infra-auricular regions considerably swollen. This condition was increased on the fifth day. The whole parotid region, as well as the adjacent part of the cheek and neck, was swollen as in mumps, tender to the touch, and of a bluish-red and yellow color, showing an extensive extravasation of blood. The bleeding from the wound continued free whenever the tube was removed. The patient was feverish, felt uneasy, and informed me that whenever she had cut herself she had had the greatest trouble to still the bleeding, and she had repeatedly had very profuse epistaxis. Now no longer doubting that she suffered from a pronounced hemorrhagic diathesis, I inserted a smaller and thinner silver tube into the wound, and prescribed 0.20 quinine to be taken three times daily. She improved at once, and in about two weeks the swelling and suffusion in the parotid region had disappeared. The bloody discharge from the wound, though moderate in quantity, did not cease, and fresh bleeding ensued as often as the tube was removed. I inserted a still thinner and shorter tube, which was changed twice daily, and always covered with the absorbent cotton. Although suppuration was absent there was no tendency to cicatrization of the walls of the new canal. I continued the treatment over seven weeks, and all that time blood escaped freely when the tube was removed, and oozed out when the tube was in the wound. I did not venture to insert a laminaria bougie for fear of a repeated effusion of blood into the parotid region. At last, Nov. 3, 1881, I gave the treatment up, left the tube off, whereupon the wound speedily healed, showing at the orifice of the ear canal a deeper depression than had been there before the operation. Otherwise nothing was changed in the patient's condition, except that her naso-pharyngeal catarrh was improved, and her hearing better than at the time when she first presented herself.

Remarks.—Apart from the rarity of the affection, and the unexpected complication with hæmatophilia, the case offers still this interesting feature, that blood found its way through the interruptions in the cartilage of the ear canal—*incisuræ Santorinianæ*—into the substance and surroundings of the parotid gland. It is well known that the glandular tissue touches the cartilage of the ear canal, and that pus from the ear sometimes infiltrates the gland, while on the other hand pus from the gland may find an outlet into the ear canal. Otorrohœa as a symptom of primary or metastatic parotitis has not infrequently been observed and described; the most notorious instance of the latter kind is the case of the late President Garfield.

A CASE OF TRANSIENT POISONING FROM THE INSTILLATION OF A FEW DROPS OF ATROPIA INTO A HEALTHY EAR CANAL.

By H. KNAPP.

THAT a half-per-cent. or one-per-cent. solution of atropia when instilled into the eyes of persons particularly susceptible for this drug, may produce inordinate and poisonous effects, even after a few applications only, has been observed everywhere, and a number of such extraordinary cases have come to my own notice, but that the same effects may be produced by instillations into a healthy ear canal, was unknown to me until, quite recently, such an instance occurred in my private practice. The history of the case is as follows:

Mrs. J. L., æt. 25, a healthy lady of New York, consulted me Nov. 14, 1881, on account of pain in and especially below her right ear, from which she had suffered, more or less, for two years. I found her hearing normal, her right drum-head slightly pinkish, the bright spot divided, after inflation normal; mild catarrhal pharyngitis. The left ear normal. The pain of which she complained being quite out of proportion to the symptoms of aural catarrh, I ordered, besides chlorate of potash for the naso-pharynx, a half-per-cent. solution of sulphate of atropia warm to be instilled into the ear two or three times daily, since this remedy has of late years been favorably spoken of as alleviating pain in the ear. On the evening of the 14th of October she put a few drops of the warmed solution into the ear. The pain diminished, and she had no unpleasant symptoms from the remedy. The next day, at 8 A. M., she dropped four drops of the same solution in, and put some wadding into the canal. The pain subsided, and she felt well until 12½ P. M., when her hands and fingers began to swell and became stiff, her face was scarlet, her eyes swollen, her throat excessively dry, her tongue thick, her lower lip swelled and hung down, her heart beat violently, and she felt intensely hot. Cold water gave her no relief. These symptoms grew steadily worse until 5 P. M., when they began to abate, and at 6 P. M. she felt well again. When she came to me the next morning, I found her *in statu quo ante.* As the atropia seemed to have relieved her otalgia, I told her to dilute the atropine solution, and instill two drops when she felt worse. This was done, and had no poisonous effect. The pain gradually disappeared.

Her physician informed me that on other occasions he had also noticed her unusual susceptibility for atropia. In the instance related above the absorption of the drug must have taken place through the healthy skin, probably the sudoriferous glands, as there was no ulcer, not even an excoriation, in the walls of the ear canal.

ACUTE OTITIS MEDIA SUPERVENING ON OTITIS MEDIA PURULENTA CHRONICA,

RESULTING IN NECROSIS OF TEMPORAL, OCCIPITAL, AND PARIETAL BONES, WITH CLOSURE OF LATERAL SINUS AND ABSCESS OF CEREBELLUM.

By W. OLIVER MOORE, M.D., of New York.

W. P., æt. 50, German, machinist by occupation.

Previous history.—Three years since he had an attack of earache, followed by a discharge of pus from the right ear. The acute symptoms rapidly subsided, leaving only a slight discharge, which has continued to the present time.

Present condition, Sept. 14, 1881.—The patient, while bathing, got salt water into the ear, causing great pain at the time, increasing in the following twenty-four hours. When first seen on Sept. 15th the meatus was filled with pus, the membrana tympani perforated, the tissues over the mastoid much swollen, R H D=$\frac{0}{48}$. An incision was immediately made over mastoid three fourths of an inch long and down to the bone, thoroughly dividing the periosteum ; no pus escaped. The wound was dressed by carbolized tent.

Sept. 22d.—Patient lost sight of since last date, returns with increased, swelling and pain over mastoid region. The former incision, partly closed was now enlarged, this time with an escape of pus. A probe can be passed through carious bone into the mastoid cells.

Sept. 29th. Wound dressed daily ; large amount of pus escapes from it, also from meatus.

Nov. 12th. Complains of pain in head ; pus still escaping ; bone spongy.

Nov. 15th. Hardly able to walk ; great pain in head ; loss of appetite, nausea and vomiting. Less pus from wound and meatus; temperature 100° F., pulse 78; rational but lethargic.

The temperature fluctuated from 98.5° F. to 100° F., this being the highest, except that reached one hour before death, when it rose to 105° F.

The pulse varied from 60 to 80, and reached 120 only one hour before his demise.

From Nov. 16th to the 18th he remained in a semi-conscious condition, pus from meatus and wound escaping in small quantity only.

Nov. 19th. Right side, facial paralysis, and marked divergent strabismus; pupils contracted.

An ophthalmoscopic examination made at this time showed slight venous engorgement, otherwise appearances were normal.

Nov. 20th. Death, after four hours of coma.

Post-mortem appearances.—Autopsy four hours after death. Extensive caries was found extending backward and upward from the mastoid process as far as the parieto-occipital suture, and upward to the temporo-parietal suture; an opening was found through this suture (caused by an erosion of the borders of the suture), leading into the cavity of the skull, being on a level with the lateral sinus.

A probe passed through the external opening led into the lateral sinus, and was arrested in its course where the sinus joins the internal jugular vein. The sinus was like a fibrous cord, being very much thickened.

The meninges were very much congested, especially so at the posterior regions. Dura mater adherent at posterior third of longitudinal sinus; also small quantity of lymph between it and the cerebral substance.

In the posterior fossa a layer of pus was found between the dura and skull, the bones being eroded and softened. Posterior part of right hemisphere more elevated than opposite.

The right lobe of the cerebellum contained an abscess as large as a black walnut, situated in the centre of the lobe; the membrane enclosing it was quite thick; the contained pus was fetid.

The mastoid cells were free of pus; the tympanic cavity contained a few drops only.

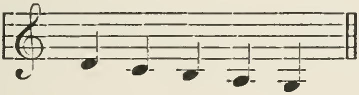
The ear disease being the starting-point, necrosis of cranial bones following, then phlebitis of lateral sinus and abscess of the cerebellum; the patient finally succumbed to the acute meningitis.

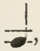
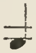
DOUBLE HEARING DURING THE EXHIBITION OF IODIDE OF POTASSIUM.

By Dr. S. MOOS, of Heidelberg.

Translated by James A. Spalding, M.D., Portland, Me.

THE patient, æt. 40, had suffered for a long time from "nervous asthma." In the beginning of July, his medical adviser ordered potass. iodid., 10 grains daily, which was continued till July 14th. It was then omitted on account of well-marked ozæna, diminution of appetite, and disagreeable itching on the arms and legs. On July 15th, the patient's left ear felt numb, and on playing the piano he was astonished to hear double (one half tone). The notes affected were:



D was still almost pure, but and , and , and so on, were harmonious, the lower tone being heard in the left ear, the higher in the right. From  downward the tones were again pure.

July 16th, the anxious patient presented himself with extensive iodide exanthema over the shoulders and on the extremities, violent sneezing, and excessive lachrymation. Nothing abnormal could be discovered in the ear. I simply advised him to discontinue the iodide. Double hearing continued till July 18th, 4 P. M., when it disappeared and has not since been noticed.

I suspect that at the height of the iodide cure, a similar process to that upon the skin was going on in the cochlea, and that minute petechiæ on the zona pectinata caused an abnormal tension which caused the double hearing.

A CASE OF CHRONIC SUPPURATIVE OTITIS, WITH EXOSTOSIS OF THE AUDITORY CANAL—ABSCESS OF THE BRAIN—DEATH—AUTOPSY.

By Dr. G. S. MUNSON, of Albany, N. Y.

A fatal result ensuing from chronic otitis media suppurativa is no new thing to aural surgeons, yet when occurring in connection with an exostosis confining the tympanic secretions, its history may become instructive and worthy of record.

I was called Nov. 8, 1881, in consultation with Dr. Van Derveer, of Albany, to see Miss K. W. H., thirty-nine years of age, good constitution, but much reduced by anxiety and constant watching with a sick parent. Dr. V. had first seen her three days previously, and found her suffering from what was then considered an attack of nervous prostration and neuralgia, resulting from a recent cold. She complained of slight pain in her left ear. The doctor ordered Brown-Séquard pills with quinine. On inquiry the following facts were elicited.

At the age of five years, during an attack of scarlet fever, a discharge had commenced from the left ear, which had continued almost uninterruptedly to the present, and had been accompanied by occasional attacks of earache. Otherwise her health has been good. As the result of an extension of the tympanitic inflammation to the Fallopian canal the facial nerve on the affected side had been partially paralyzed. She was treated by electricity with considerable benefit.

Status Præsens.—Left ear alone affected. Had vomited during the day, which she thought was caused by indigestion. There was a slight sanious discharge from her ear, but no more in quantity than had existed for thirty years. Examination with the speculum and reflected light rendered difficult, owing to the swelling of the tissues occluding the canal ; while the auricle was blistered from the constant application of camphor. There was little pain within the ear, but the patient complained mostly of a very annoying tinnitus, for which she sought relief. No mastoid symptoms, convulsions, or paralysis. Complained of considerable headache, but it was confined to the right side. Thirst great, but relieved with lumps of ice. Respiration normal ; pulse 80 ; the tongue slightly coated. Auditory condition : Loudest voice not heard at all ; watch pressed against the auricle and over the mastoid process not heard. Says she has been completely deaf in that ear for thirty years. Eustachian tube leading to the affected ear closed.

The treatment adopted was first an endeavor to open the Eustachian tube, but this resisted all efforts with Politzer's bag ; the patient refused to allow the passage of the ordinary catheter. The patient suffered so little pain in the ear that only a mild anodyne was prescribed for nights. As the tinnitus was in both ears, I thought it probably due to the quinine she had been taking, and so advised a change of tonics. The diet was made as nourishing as possible, and the patient was not allowed to sit up or see friends.

On my second visit the walls of the canal were less swollen, so that I was able to diagnose a polypus. Suspecting that the polypus might be confining the pus and producing the neuralgic symptoms, the patient was informed of my suspicions, and that an immediate operation was necessary ; also that delay might be serious. She refused such treatment then ; thought her ear was in every way much better ; and would delay the operation till she had regained her strength.

Nov. 10*th*. I saw her to-day prepared to operate, but while attempting to probe the ear she refused further treatment, assuring me that she thought her ear was as well now as it had ever been, was free from pain, and that in her present weak and nervous condition she would have nothing further done till she had regained her strength. I could only leave with warning words to summon a physician at the least unfavorable turn in her symptoms. There was at this time no specially threatening symptom to arouse the apprehension of the physician, but her general condition seemed about as comfortable as it had been for some days.

On the 15th, at 1 A. M., the mother states that the patient complained of an increase of the pain within her head, and seemed a little delirious. At four o'clock the mother found the patient lying on the floor by the bed unconscious. On arrival I found the temperature 107°; pulse 110; the patient foaming a little at the mouth and lying in a comatose state from which it was impossible to arouse her; no voluntary motion. The remainder of her history is briefly told. 6 P. M., the left eye rolled in toward the nose; the irides did not respond to light; no discharge from the ear; gurgling of secretions in the bronchial tubes and throat. 9 P. M., died.

Autopsy.—The autopsy, conducted eighteen hours after death, revealed the following, the head being alone examined. The external auditory meatus contained granulating polypoid tissue springing from the sides of an exostosis, which almost completely occluded the canal, the only opening being found with a needle in the superior and anterior portion of the meatus. The exostosis undoubtedly was a hyperplastic growth, the result of irritative processes dependent upon a chronic otorrhœa, and taking its origin from the floor and sides of the meatus close to the membrana tympani; whether single or multiple I was unable to determine. On removing the skull-cap evidences of a former meningitis were discovered on the convex portion of the cerebral lobes. At no point was pus found beneath the dura mater; but the meningeal vessels were large and exceedingly numerous. The removal of the dura showed a slight caries of the superior wall of the petrous bone immediately over the semicircular canals, but no distinct sinus leading to the internal ear could be found. There was then noticed a clearly defined spot on the meninges at the under surface of the middle lobe, circular, about an inch in diameter, with a central perforation 4 *mm* in length and 1 *mm* in breadth. A probe passed through this opening into an abscess cavity within the middle lobe of the cerebrum. On opening the cavity there was revealed an abscess the size of a hen's egg, and containing, as near as we could judge, an ounce of dark-greenish, fetid pus. In the neighborhood of the abscess the brain was much softened, but otherwise normal. The position of the abscess corresponded with the perforation of the dura mater, being directly above the semicircular canals. The lateral ventricles were normal.

Remarks.—In no case is the axiom "an ounce of prevention is worth a pound of cure" truer than in the early history of ear diseases, as every otologist well knows. We cannot doubt that in the case under discussion the fatal result was but the climax of a disease of thirty years' duration.

We regret that the temporal bone could not have been obtained for minute anatomical dissection. The parts in the tympanic cavity were probably in a carious condition. The mastoid cells and antrum may have been sclerosed or little changed, for at no time were there symptoms of mastoid complication.

The indirect cause of death was an exostosis confining the tympanic secretions. The pathology of this case probably consisted in an acute inflammation, followed by suppuration, which was allowed to become chronic. There then ensued a growth of polypi. This excessive granulation tissue subsequently became organized into the bony growth. These bony growths may go on increasing in size, absolutely without symptoms, till complete occlusion of the canal has resulted. Their removal is distinctly indicated when a suppurative otitis media is present, and their steady increase threatens to occlude the meatus and cause retention of pus and caries of the bone. If an operation is allowed, it should be performed early. We now know had the exostosis been removed as early as the first day on which I saw the patient it would still have been too late and impossible to have afforded permanent relief, for, judging from the greenish pus and its quantity found in the brain abscess, already fatal complications must have been in progress.

It is a noticeable feature in our case that the pus did not find a passage from the labyrinth by the aquæductus vestibuli or the internal ear canal, but worked its way through the roof of the bone immediately over the semicircular canals where the petrous portion is especially thin. There it produced pachymeningitis with perforation and a direct abscess of the middle lobe.

RESULTS OF AN EXAMINATION OF THE EARS AND THE HEARING OF 5,905 SCHOOL-CHILDREN.

BY E. WEIL, OF STUTTGART.

Translated by WM. C. AYERS, M.D., New York.

EXAMINATIONS of the eyes of school-children have often been made since the first publication of Cohn, of Breslau, on this subject; the condition of their ears has, however, received but little attention.

I know of only two publications in this direction: the one from Reichard,[1] of Riga, and the other from myself.[2] That of Reichard is unfortunately but little known; indeed, my own attention was first called to it but a short time ago. Reichard examined 1,055 children with the watch, and found that 22.2 per cent. heard it badly, showing that this instrument is not a good one for determining the distance at which the normal ear should hear distinctly. On examining 267 children, I myself found that over 30 per cent. did not hear the whisper at eight metres.

In my earlier publication I gave a brief report on the results of a series of experiments, which I wish to publish more fully in this paper.

The probable reason why such examinations have not been made more frequently, is to be found in the fact that we have no trustworthy method of determining the power of hearing, notwithstanding the numerous recent articles on this point. We are very much indebted to *Itard*, *Wolke*, *Saunders*, *Schmalz*, *Rau*, and recently to *Wolf*, *Conta*, *Magnus*, *Lucae*, *Prout*, *Knapp*, *Hartmann*, *Preyer*, *Wodtke*, *Hughes*, *Horting*, *Politzer*, and others, for their labors, but nevertheless, they have not as yet furnished us a method which will hold good for all cases. The watch which was first used by *Saunders*, and Politzer's acoumeter have only one or two tones, or sounds. The perception of these, however, does not furnish us any knowledge as to the condition of the ear in general, and especially its capacity of hearing the human voice. For practical reasons we must have a method for determining the capacity of the ear for speech, and it is to be hoped that the future will furnish us with such an instrument. According to the majority of authors, the voice or whisper is still the best method which we have,[1] but unfortunately this method leaves much to be desired, as I have found during the present series of experiments. It requires a certain extent of space, which is often not practical, since according to *Wolf*, *Chimani*, and *Hartmann*, a whisper should be heard at 20–25 metres, and frequently we can not have so large a room at our disposal. Then again, the distance at which it is heard depends upon the attention with which the person examined listens, upon the intensity of intonation, upon the measure, the articulation, and upon the particular words chosen, upon the possibility of guessing the words, the place of examination, the surroundings, and probably upon the state of the weather. Moreover, the examination of one ear is very much influenced by that of the other. Some of these objections would be found in any method, but some again arise from the voice itself. The most important of these are the intensity of the sound, and the choice of words and sentences.

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[1] The influence of good hearing on the progress of school-children, by W. v. Reichard, physician to the City College at Riga. *St. Petersburger Med. Wochenschr.*, 1878, No. 29.

[2] *a.* The results of an examination of the hearing of 267 children. *Montsschrift für Ohrenheilkunde*, etc., 1880, No. 12. *b.* Preliminary communication concerning the results of an examination of the hearing of 4,500 school-children. *Württ. Med Correspondenzblatt*, 1881, No. 27.

The distance of hearing depends very much upon the intensity of the voice and the words chosen, but unfortunately it is almost impossible to keep the voice at the same pitch, and again we involuntarily modulate our voice according to the distance at which we are speaking. For instance, at greater distances we speak louder than when close by, and single words not so loud as sentences, and again, some words louder than others. Words which have many vowels in them, and those with hissing sounds are heard further than others which abound in consonants. Lucæ[1] first drew attention to this through using certain words and by the use of his maximal phonometer. I have recently striven to attain an equal intensity in examinations by whispering all words in the same time, without any effort on my own part. In my experiments I did not take this precaution, and the results are not in unison, since I was forced to use rooms of different extents in the different schools. They varied in length from 7 to 25 metres, and sometimes there were more noises in the vicinity than at others. Therefore the figures which I give are not exact. In general, I can state that the figures show a great difference in the power of hearing in younger individuals, and from this fact they derive their value. I shall have accomplished my purpose if, in writing this paper, I draw more attention to the examination of the ear, and bring forward more investigation in this direction. That such will be the case I conclude from the approval which my first communication has received.

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[1] Compare O. Wolf: "Speech and Ear," Braunschweig, 1871.

The experiments were made in one public school, three common schools, two intermediate schools, a college, one higher school for girls, and in one elementary school; in three large institutes, viz., orphan asylum, blind asylum, and a protectory.

I chose these particular schools because in them I could examine boys and girls of all classes of society.

The common schools were attended chiefly by the poorer classes, working people, etc.; the intermediate school by artisans, and the higher schools more by the better classes of society; the same being the case in the primary school. The public school of Degerloch, as is always the case, is frequented by all the children of the village, whether rich or poor.[1]

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[1] *Archiv für Ohrenhlkde.*, Band vi.

All examinations were made in the following manner.

The children were brought into a room set apart for the purpose in the order of their seats in school, four or six at a time, during school-hours.

First the name and age were taken, and then their height. Asked whether they had had scarlet fever, diphtheria, earache, noises in the ear, suppuration, and such like affections, and then the ears examined by sunlight, with a plane mirror. Next the distance at which they heard whispering was noted—each ear separate. Each child was placed at a distance and required to repeat what I said. I gave up the examination with the watch since I soon saw it was too uncertain, nor could I use Politzer's hammer, because it required too much space, being heard by good ears at 25 metres.

Different sentences were spoken to each child in order to obtain all possible exactness. In those cases where there were difficulties of hearing the examination was more extensive. In every result where there was doubt I recorded it *in meliorem partem.* When three children had been examined three more were taken, so that there was a continuity in experimentation which saved much time. If any one was found hard of hearing, the teacher of the class was asked as to the attention of the child, or if he had noticed it before.

The interest which the children exhibited was of great service. They all wished to hear well, and I believe that there were but few who did not try to hear the test sentences as far as possible. I would also state that they were all willing to be examined with the exception of one, whose father had positively forbidden that his child should be used for such experiments.

We will now pass on to the results, but in order to understand them properly I would like to remark, that one of the public schools is located in an old building in the middle of the city, and is recruited principally from damp old streets; the other is in a new, well-ventilated building, and is situated in the western part of the city, in the centre of a manufacturing district. The third is also in a new building, and draws its pupils from a district which is not thickly populated, north of Stuttgart; they come from the so-called Prag and railroad village, both to the north of the city valley. The railroad village is inhabited only by employés of the railroad and postal departments. The children of this class are well fed and well taken care of. They live better in this locality than those belonging to better families residing in the middle of the city.

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[1] Degerloch is a flourishing wine and grain-growing village, and to a certain extent manufacturing, situated on a high plain to the south of Stuttgart.

The pupils of the intermediate, high, and elementary schools come from all parts of the city. The orphan school comprises both children who reside in the house and day scholars.

The table which I insert gives the number of scholars examined, with boys and girls separate, the condition of the external canal and vicinity, the posterior fold, suppuration, calcification, and the percentage of each condition. (See Table I.)

Accordingly there were 5,905 children examined, 3,228 of which were boys, and 2,677 girls.

There was impacted cerumen, or simply wax in the canal, in boys, 11%; in girls, 15.1%.

We therefore see how frequently we find impacted wax, and more so in girls than in boys.

Impacted wax and wax in the canal, which means plugs closing the canal, and a tendency to the formation of a plug are, of course, put together.

Under impacted wax all cases are entered, where there was nothing to be seen of the drum-membrane, and under wax in canal, where at least a segment of the drum-membrane was obscured. In some cases of impacted wax there was but a small collection of wax, perhaps only temporary, but it always closed the lumen of the canal.

In this category are of course included cases with a fold, which likewise enter into the category of the posterior folds, the plug making a further diagnosis impossible. It

TABLE I.

NAME OF SCHOOL.	NUMBER OF		IMPACTED WAX.		WAX IN CANAL.		PER CENT. OF WAX, ETC.		POSTERIOR FOLD.		PER CENT. OF POST. FOLD.		SUPPURATION.		PERCENTAGE OF SUPPURATION.		DEPOSIT OF CHALK.		PERCENT. OF DEPOSIT OF CHALK	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
Degerloch Public School .	202	—	8	—	8	—	7.9	—	20	—	9.9	—	5	—	2.4	—	4	—	1.9	—
" " " .	—	203	—	10	—	14	—	11.3	—	24	—	11.3	—	5	—	2.4	—	1	—	0.4
Elementary " .	327	—	20	—	15	—	10.7	—	39	—	11.9	—	5	—	1.5	—	4	—	1.2	—
Orphan Asylum . .	219	—	7	—	8	—	6.8	—	31	—	14.1	—	1	—	0.4	—	3	—	1.3	—
" "	—	66	—	11	—	3	—	12.2	—	4	—	6.0	—	2	—	3.0	—	—	—	—
Nicolas School, a blind	22	—	1	—	2	—	13.5	—	—	—	—	—	—	—	—	—	—	—	—	—
asylum . . .	—	13	—	3	—	—	—	23.0	—	—	—	—	—	—	—	—	—	—	—	—
Pauline School, a pro-	43	—	5	—	3	—	18.6	—	7	—	16.2	—	—	—	—	—	3	—	6.9	—
tectory . . .	—	19	—	4	—	1	—	26.3	—	—	—	—	—	—	—	—	—	—	—	—
Eberhard School a public	496	—	40	—	33	—	14.7	—	33	—	6.6	—	13	—	2.6	—	11	—	2.2	—
school . . .	—	609	—	60	—	43	—	16.9	—	18	—	2.9	—	13	—	2.1	—	7	—	1.1
Johannes Public School .	327	—	32	—	16	—	14.6	—	36	—	11.0	—	11	—	3.3	—	—	—	—	—
" " .	—	313	—	41	—	10	—	16.2	—	37	—	11.5	—	19	—	6.0	—	3	—	0.9
Stöckach " " . .	350	—	22	—	14	—	10.2	—	39	—	11.1	—	—	—	—	—	—	—	—	—
" " .	—	385	—	31	—	25	—	14.3	—	29	—	7.5	—	1	—	0.2	—	8	—	2.0
Common School, Intermediate	547	—	36	—	20	—	10.2	—	21	—	3.8	—	11	—	2.0	—	7	—	1.2	—
Girls' Intermediate School .	—	623	—	41	—	46	—	13.9	—	26	—	4.1	—	19	—	3.0	—	7	—	1.1
Catherine High School, Girls	—	446	—	34	—	29	—	14.1	—	25	—	5.5	—	3	—	6.0	—	—	—	—
Colleges, Old and Carl's .	575	—	30	—	30	—	9.3	—	37	—	6.4	—	15	—	2.6	—	18	—	3.1	—
High College . . .	120	—	1	—	1	—	11.6	—	2	—	1.6	—	1	—	0.8	—	—	—	—	—
Boys . .	3228	—	208	—	150	—	11.0	—	265	—	8.2	—	62	—	1.9	—	50	—	1.5	—
Girls . .	—	2677	—	235	—	171	—	15.1	—	163	—	6.0	—	62	—	2.3	—	26	—	0.9

is evident that such complications often occur, and I have frequently had an opportunity of confirming the diagnosis, having treated the same child afterward in private practice.

The accumulations were generally on one side.

Their color differed from black to light yellow.

The yellow crumbling mass was frequently on both sides. Noises or diminution of hearing were not caused by the plug in this condition.

If we leave out of consideration the children of the public school and orphan asylum (since they had been treated for their ears before), it appears that the children of the better classes do not have impacted wax as often as those of the poorer classes, but in the comparison we must of course compare males with males, and females with females. In order to appreciate the astonishing difference between the number of boys and of girls who have impacted wax, I would remark that I think there are causes which tend to bring about such conditions, such as frequenting dusty places, etc.

Posterior fold was found: in the boys, 8.2%; in the girls, 6.0%.

A posterior fold was found often on one side, often on both; sometimes it seemed to have existed for a long time, but generally it appeared as if it were of recent origin. In the orphan asylum I found it very often; indeed, in 14.1% of the boys. When I examined the same institution the previous year, and with the exception of the oldest and youngest, the same children were present, I found it in only four cases.

A large number of these with the posterior fold (but not all) had defective hearing; some of them complained of noises.

Suppuration.—Under this head are included all cases in which pus was found in the ear, with the exception of those where it issued from the canal itself. The percentage of perforation of the drum-membrane was: in boys, 1.9%; in girls, 2.3 %.

Suppuration was found most frequent in the Johannes school, and least of all in the Stöckach school, where it was present in only one girl.

According to the history given there were many children who had had running from the ear at some past period of life; for instance, in the Eberhard school, of the 1,105 children examined, there were 26 with actual suppuration, whereas 60 said they had had it at some time past. Only a few of these 60 had been under treatment. Consequently in a great majority of cases it had ceased of itself.

In this place I will mention that many had had some sort of ear disease, since, in the 1,105 children of the Eberhard school, 216 said they had had earache, but whether it was simply pain, without other complications, was impossible to determine.

Calcification was quite frequent, showing in the boys, 1.5%; in the girls, 0.9%.

Most of these declared that they had never had running from the ear, while but few acknowledged such to have been the case. The majority gave a history of having had noises in the ear at the time.

The deposits of chalk varied in size and shape.

It seems to me to be of great interest to know how far scarlet fever, measles, and diphtheria have been the cause of the various conditions noted in table I.

I have examined the children in the Eberhard school on this point, and have chosen them especially, since from these I could get better histories; they were all told the day before they were to be examined, to ask their parents about these diseases. It was consequently declared that in the 1,105 children, 479 had not had either of the above affections.

The remaining 626, or 56% of the whole, had had them in the following ratio:

Scarlet fever, 57.
Diphtheria, 20.
Measles, 352.
Scarlet fever and measles, 115.
Scarlet fever and diphtheria, 10.
Measles and diphtheria, 30.

Scarlet fever, measles, and diphtheria, 36.

Among those who had remained free from these diseases, 68 or 14.2% had either impacted wax or wax in the external canal; 25 or 5.2% had posterior folds, and 10 or 2.0% suppuration.

Of the 626 who had had them, were:

105 or 16.7% with wax.

26 or 4.1% with the fold.

16 or 2.5% with suppuration.

Therefore with those who had had these diseases, we find that there were 2.5% more who had wax, etc., 0.5% more with suppuration, and 1.1% less with the posterior fold than among those who had not had them.

Among the 1,105 of the Eberhard school children we find 353 who hear badly, and of these there were 191 or 30.5% who had suffered from the diseases under consideration.

Of the 479 who had remained free, we find 161 or 33.8% with defective hearing; therefore we find that among those with the diseases there were 3.5% less with defective hearing than among those who had remained free from them! (?)

In this place I will remark that I have found furuncles but seldom; eczema somewhat more frequently; polypi and foreign bodies only occasionally; in one instance a pearl bead; and one case where there was a closure of the external canal.

Anterior fold, great retraction of the drum-membrane, abnormal position of the handle of the malleus, isolate transparent places and cicatrices in the drum-membrane, were quite frequent, even in the youngest children, (compare table II).

Table II will be seen to present the percentage of wax, posterior fold, suppuration, and deposit of chalk according to the age of the patient.

That tables I and II do not agree in their results will be found in the fact that in table II there is no notation of cases over 18 years, nor under 6 years.

It is difficult to draw conclusions from table II, and we must therefore wait for further statistics.

TABLE II.

AGE.	NUMBER OF CHILDREN.		IMPACTED WAX.		WAX IN CANAL.		PER CENT. OF IMPACTED WAX, ETC.		POSTERIOR FOLD.		PER CENT. OF POST. FOLD.		SUPPURATION.		PER CENT. OF SUPPURATION.		DEPOSIT OF CHALK.		PER CENT. OF DEPOSIT OF CHALK.	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
Six years old .	56	48	4	3	1	5	8.9	16.6	4	4	7.1	8.3	1	—	1.7	—	—	—	—	—
Seven " .	234	310	14	30	12	30	11.1	19.2	28	19	11.5	6.1	4	8	1.7	2.5	3	2	1.2	0.6
Eight " .	608	396	41	28	32	27	11.9	13.8	82	27	13.5	6.8	6	11	0.9	2.7	4	2	0.6	0.5
Nine " .	445	405	21	28	31	20	11.6	11.8	31	37	6.9	9.1	11	12	2.4	2.9	6	3	1.3	0.7
Ten " .	456	428	30	37	15	33	9.7	16.3	22	25	4.8	5.8	10	6	2.1	1.4	11	2	2.4	0.4
Eleven " .	415	371	30	29	11	27	9.8	15.0	26	26	6 3	7.0	3	11	0.7	2.9	8	6	1.9	1.6
Twelve " .	372	369	23	44	17	18	10.7	16.7	27	13	7.2	3.5	8	10	2.1	2.7	9	7	2.4	1.8
Thirteen " .	397	332	26	32	20	11	11.5	12.9	33	11	8.3	3.3	17	4	4.2	1.0	8	4	2.0	1.2
Fourteen " .	97	10	5	2	7	—	12.3	20.0	9	—	9.2	—	1	—	1.0	—	1	—	1.0	—
Fifteen " .	60	3	2	—	2	—	6.6	—	1	—	1.6	—	—	—	—	—	—	—	—	—
Sixteen " .	41	1	6	1	1	—	19.0	100.0	1	—	2.4	—	—	—	—	—	—	—	—	—
Seventeen " .	37	—	5	—	1	—	16.2	—	1	—	2.7	—	1	—	—	—	—	—	—	—
Eighteen " .	7	—	1	—	—	—	14.0	—	—	—	—	—	—	—	—	—	—	—	—	—
Total . . .	3225	2673	208	234	150	171	—	—	265	162	—	—	62	62	—	—	50	26	—	—

We will now pass to the **condition of hearing,** which I furnish directly from my notes.

The normal ear must hear the whisper tests at 20-25 *m.*, but rooms of these dimensions were not always at my disposal, and therefore in some of the schools the testing was imperfect. For the same reasons a comparison between the schools is impossible, nevertheless I record the results, school for school, as they give a picture of the great number of disturbances of hearing.

Degerloch School.

Examinations made in a room 11 metres long.

Among the 405 children of this school there were 76 under six years, and these I did not record, since their answers were not sufficiently positive.

Of those examined 164 were girls, 18 of whom heard at a distance less than 11 metres with both ears, and 7 with one ear. Together we have 25 in all or 15.1%.

There were 165 boys, and among them were 22 who did not hear at 11 metres with both ears, and 7 with one ear. Together 29 or 17.5%.

Elementary School.

Since I could not obtain a large room in this school I did not make the tests for the voice, but by a somewhat superficial examination with the watch I found quite a number who heard it badly. In this school I found a case of cleft palate, and in it hearing was very much reduced.

Orphan Asylum.

The examinations were made in a room 10 metres long, on the diagonal. Only children of the city present, and of these 66 were girls.

At a distance less than 10 metres:

	16	heard	both ears, and	2	one,	being	18	or 27.2 %
Of these less than 8 *m.*,	4	"	"	7	"	"	11	or 16.6
" " 5 *m.*,	1	"	"	1	"	"	3 %	
" " 2 *m.*,	0	"	"	2	"	"	3	

There were 219 boys and they heard as follows :

	Less than	10 *m*.,	both ears	40,	one ear	10,	being together	22.8 %
Of these	"	8 *m*.,	"	8,	"	8,	"	5.9
"	"	5 *m*.,	"	2,	"	3,	"	2.2
"	"	2 *m*.,	"	1,	"	3,	"	1.3

Asylum for the Blind.

Examination in a room 10 metres long.
Of those examined 22 were boys :

	Less than	10 *m*.,	both ears	4,	one ear	1,	together	making	22.7 %
Of these	"	8 *m*.,	"	1,	"	0,	"	"	4.5
"	"	5 *m*.,	"	0,	"	1,	"	"	4.5
"	"	2 *m*.,	"	0,	"	1,	"	"	4.5

Girls 13 in number :

Under	10 *m*.,	both ears	3,	one ear	0,	making	23.0 %
"	8 *m*.,	"	0,	"	0,	"	0

Since good hearing is of the utmost importance for the blind, they naturally pay much attention to their ears.

Protectory.

The room was 19–20 metres long, and among the inmates were 43 boys who heard :

	Less than	18 *m*.,	both ears	14,	one ear	9,	being	53.4 %
Of these	"	15 *m*.,	"	2,	"	6,	"	18.6
"	"	12 *m*.,	"	1,	"	2,	"	6.9
"	"	10 *m*.,	"	1,	"	2,	"	6.9
"	"	8 *m*.,	"	1,	"	0,	"	2.3
"	"	2 *m*.,	"	1,	"	0,	"	2 3

The girls numbered 19 as follows :

	Less than	18 *m*..	both ears	10,	one ear	2,	making	63.1 %
Of these	"	15 *m*.,	"	3,	"	4,	"	36.8
"	"	12 *m*.,	"	0,	"	2,	"	10.5
"	"	10 *m*.,	"	0,	"	0,		

The inmates of this institution seem to be kept clean and well taken care of.

Eberhard Public School.

Examination-room 7 metres long, and in a very noisy street.

There were present 623 girls; hearing as follows:

	Less than 7 *m.*,	both ears 171,	one ear 32,	making 32.6 %
Of these	“ 5 *m.*,	“ 54,	“ 22,	“ 12.1
“	“ 2 *m.*,	“ 14,	“ 9,	“ 3.6

and 485 boys showing:

	Less than 7 *m.*,	both ears 87,	one ear 56,	making 29.4 %
Of these	“ 5 *m.*,	“ 28,	“ 27,	“ 11.3
“	“ 9 *m.*,	“ 9,	“ 13,	“ 4.5

Johannes Public School.

Examination-room 9 metres long and very quiet.

There were 313 girls as follows:

	Less than 9 *m.*,	both ears 36,	one ear 12,	being 15.3 %
Of these	“ 5 *m.*,	“ 9,	“ 5,	“ 4.4
“	“ 2 *m.*,	“ 5,	“ 2,	“ 2.2

Boys numbering 327 as follows:

	Less than 9 *m.*,	both ears 100,	one ear 9,	being 33.3 %
Of these	“ 7 *m.*,	“ 10,	“ 7,	“ 5.1
“	“ 5 *m.*,	“ 6,	“ 3,	“ 2.7
“	“ 2 *m.*,	“ 3,	“ 5,	“ 2.4

In this instance the difference between the boys and girls is conspicuously in favor of the latter.

Stöckach Public School.

Examination-room quiet and 14 metres long in its diagonal.

The boys numbered 350 as follows:

	Less than 14 *m.*,	both ears 53,	one ear 9,	being 17.7 %
Of these	“ 12 *m.*,	“ 17,	“ 5,	“ 6.2
“	“ 10 *m.*,	“ 12,	“ 2,	“ 4.0
“	“ 7 *m.*,	“ 9,	“ 2,	“ 3.1
“	“ 5 *m.*,	“ 5,	“ 1,	“ 1.7
“	“ 2 *m.*,	“ 2,	“ 2,	“ 1.1

Girls 385:

	Less than	14 *m.*,	both ears	59,	one ear	2,	making	15.8 %
Of these	"	12 *m.*,	"	13.	"	2,	"	3.8
"	"	10 *m.*,	"	10,	"	2,	"	3.1
"	"	8 *m.*,	"	7,	"	1,	"	2.0
"	"	5 *m.*,	"	3,	"	0,	"	0.7
"	"	2 *m.*,	"	1,	"	0,	"	0.2

Common School. Intermediate.

Examination-room, 22 *m.* in its diagonal, and 547 boys present.

Since in this school and those to follow I found rooms large enough for the purpose, I give the results according to the age of the patients.

There were 93 eight years of age, giving:

	Less than	20 *m.*,	both ears	15,	one ear	8,	making	24.7 %
Of these	"	18 *m.*,	"	4,	"	6,	"	10.7
"	"	15 *m.*,	"	3,	"	1,	"	4.3
"	"	12 *m.*,	"	1,	"	0,	"	1.0

Nine years of age, 79:

	Less than	20 *m.*,	both ears	7,	one ear	3,	making	24.7 %
Of these	"	18 *m*,,	"	2,	"	2,	"	5.0
"	"	15 *m.*,	"	1,	"	2,	"	3.7
"	"	12 *m.*,	"	0,	"	3,	"	3.7
"	"	10 *m.*,	"	0,	"	2,	"	2.5
"	"	8 *m.*,	"	0,	"	2,	"	2.5
"	"	5 *m.*,	"	0,	"	1,	"	1.2

Ten years old, 93:

	Less than	20 *m.*,	both ears	19,	one ear	8,	making	29.0 %
Of these	"	18 *m.*,	"	8,	"	3,	"	11.8
"	"	15 *m.*,	"	3,	"	3,	"	6.4
"	"	12 *m.*,	"	1,	"	3,	"	4.3
"	"	10 *m.*,	"	0,	"	2,	"	2.1
"	"	5 *m.*,	"	0,	"	2,	"	2.1
"	"	2 *m.*,	"	0,	"	1,	"	1.0

Eleven years old, 90 boys:

	Less than	20 *m.*,	both ears	33,	one ear	6,	making	43.3 %
Of these	"	18 *m.*,	"	18,	"	6,	"	26.6
"	"	15 *m.*,	"	4,	"	2,	"	6.6
"	"	12 *m.*,	"	3,	"	1,	"	4.4
"	"	10 *m.*,	"	3,	"	1,	"	4.4
"	"	8 *m.*,	"	1,	"	3,	"	4.4
"	"	5 *m.*,	"	1,	"	2,	"	3.3
"	"	2 *m.*,	"	1,	"	1,	"	2 2

Twelve years old, 79 boys:

	Less than	20 *m.*,	both ears	33,	one ear	9,	making	53.1 %
Of these	"	18 *m.*,	"	21,	"	13,	"	43.0
"	"	15 *m.*,	"	7,	"	5,	"	15.1
"	"	12 *m.*,	"	5,	"	4,	"	11.3
"	"	10 *m.*,	"	3,	"	4,	"	8.8
"	"	8 *m.*,	"	2,	"	3,	"	6.3
"	"	5 *m.*,	"	1,	"	1,	"	2.5
"	"	2 *m.*,	"	1,	"	1,	"	2.5

Thirteen years old, 111 boys:

	Less than	20 *m.*,	both ears	65,	one ear	17,	making	73.9 %
Of these	"	18 *m.*,	"	43,	"	17,	"	54.0
"	"	15 *m.*,	"	21,	"	12,	"	29.9
"	"	12 *m.*,	"	7.	"	8,	"	13.5
"	"	10 *m.*,	"	3,	"	10,	"	12.6
"	"	8 *m.*,	"	3,	"	5,	"	7.2
"	"	5 *m*,,	"	2.	"	4,	"	5.4
"	"	2 *m.*,	"	1,	"	4,	"	4.5

Female Intermediate School.

I examined 623 girls from this school in a room whose diagonal was 22 metres long.

There were 100, seven years old, hearing as follows:

	Less than	20 *m.*,	both ears	30,	one ear	7,	making	37.0 %
Of these	"	18 *m.*,	"	17,	"	5,	"	22.0
"	"	15 *m.*,	"	9,	"	5,	"	14.0
"	"	12 *m.*,	"	5.	"	2,	"	7.0
"	"	10 *m.*.	"	2,	"	4,	"	6.0
"	"	8 *m.*,	"	1,	"	2,	"	3.0
"	"	7 *m.*,	"	1,	"	2,	"	3.0
"	"	5 *m.*,	"	1,	"	2,	"	3.0
"	"	2 *m.*,	"	1.	"	1,	"	2.0

Of eight years old, 85, as follows:

	Less than	20 *m.* ,	both ears	32,	one ear	5,	making	43.5 %
Of these	"	18 *m.*,	"	25,	"	4,	"	34.1
"	"	15 *m.*,	"	14,	"	4,	"	21.1
"	"	12 *m.*,	"	4,	"	6,	"	11.7
"	"	10 *m.*,	"	3,	"	3,	"	7.0
"	"	8 *m.*,	"	2,	"	3,	"	5.8
"	"	7 *m.*,	"	2,	"	2,	"	4.7
"	"	5 *m.*,	"	2,	"	1,	"	3.5
"	"	2 *m.*,	"	2,	"	0,	"	2.3

Of nine years old, 89:

	Less than	20 *m.*,	both ears	37,	one ear	7,	making	49.3 %
Of these	"	18 *m.*,	"	32,	"	5,	"	41.5
"	"	15 *m.*,	"	19,	"	10,	"	32.5
"	"	12 *m.*,	"	15,	"	4,	"	21.3
"	"	10 *m.*,	"	10,	"	5,	"	16.8
"	"	8 *m.*,	"	8,	"	3,	"	12.3
"	"	7 *m.*,	"	7,	"	2,	"	10.1
"	"	5 *m.*,	"	5,	"	3,	"	8.9
"	"	2 *m.*,	"	3,	"	3,	"	6.7

Of ten years old, 83, as follows:

	Less than	20 *m.*,	both ears	49,	one ear	3,	making	62.6 %
Of these	"	18 *m.*,	"	44,	"	3,	"	56.6
"	"	15 *m.*,	"	30,	"	11,	"	49.3
"	"	12 *m.*,	"	22,	"	4,	"	31.3
"	"	10 *m.*,	"	12,	"	7,	"	22.8
"	"	8 *m.*,	"	4,	"	3,	"	8.4
"	"	7 *m.*,	"	3,	"	1,	"	4.8
"	"	5 *m.*,	"	1,	"	1,	"	2.4

Of eleven years old, 90, as follows:

	Less than	20 *m.*,	both ears	56,	one ear	4,	making	66.6 %
Of these	"	18 *m.*,	"	46,	"	7,	"	58.8
"	"	15 *m.*,	"	26,	"	6,	"	35.5
"	"	12 *m.*,	"	14,	"	8,	"	24.4
"	"	10 *m.*,	"	9,	"	6,	"	10.6
"	"	8 *m.*,	"	5,	"	4,	"	10.0
"	"	7 *m.*,	"	4,	"	2,	"	6.6
"	"	5 *m.*,	"	1,	"	4,	"	5.5
"	"	2 *m.*,	"	0,	"	2,	"	2.2

Twelve years old, 86, as follows:

	Less than	20 *m.*,	both ears	59,	one ear	11,	making	81.3 %
Of these	"	18 *m.*,	"	51,	"	6,	"	86.2
"	"	15 *m.*,	"	40,	"	7,	"	54.6
"	"	12 *m.*,	"	34,	"	3,	"	43.0
"	"	10 *m.*,	"	21,	"	7,	"	32.5
"	"	8 *m.*,	"	12,	"	2,	"	16.5
"	"	5 *m.*,	"	5,	"	2,	"	8.1
"	"	2 *m.*,	"	2,	"	1,	"	3.4

Thirteen years old, 80:

	Less than	20 *m.*,	both ears	71,	one ear	3,	making	92.5 %
Of these	"	18 *m.*,	"	60,	"	7,	"	83.7
"	"	15 *m.*,	"	57,	"	3,	"	67.5
"	"	12 *m.*,	"	44,	"	7,	"	63.7
"	"	10 *m.*,	"	33,	"	8,	"	51.2
"	"	8 *m.*,	"	16,	"	8,	"	30.0
"	"	7 *m.*,	"	14,	"	4,	"	22.5
"	"	5 *m.*,	"	2,	"	5,	"	8.7
"	"	2 *m.*,	"	0,	"	3,	"	3.7

It would seem that the pupils of this school heard badly, but perhaps it is from the fact that I spoke somewhat low in the examinations. I think this the more probable since this was the first school I examined in a room which was really large enough, and in order not to speak too loud, I used too moderate a whisper, and thereby fell into one error while I was trying to avoid another.

High School for Girls.

Examinations made in a room 25 metres long; 446 girls were tested.

There were 21 seven years old who heard as follows:

	Less than	20 *m*.,	both ears	4,	one ear	3,	being	33.3 %
Of these	"	18 *m*.,	"	2,	"	0,	"	9.5
"	"	15 *m*.,	"	1,	"	0,	"	4.7

Eight years old, 51, as follows:

	Less than	20 *m*.,	both ears	9,	one ear	6,	making	29.4 %
Of these	"	18 *m*.,	"	4,	"	4,	"	15.6
"	"	15 *m*.,	"	4,	"	3,	"	13.7
"	"	12 *m*.,	"	4,	"	0,	"	7.8
"	"	10 *m*.,	"	3,	"	0,	"	5.8
"	"	8 *m*.,	"	2,	"	0,	"	3.8
"	"	5 *m*.,	"	0,	"	2,	"	3.8

Nine years of age, 54, as follows:

	Less than	20 *m*.,	both ears	12,	one ear	8,	being	37.0 %
Of these	"	18 *m*.,	"	9,	"	4,	"	24.0
"	"	15 *m*.,	"	4,	"	3,	"	12.9
"	"	12 *m*.,	"	0,	"	6,	"	11.1
"	"	10 *m*.,	"	0,	"	2,	"	3.7
"	"	8 *m*.,	"	0,	"	2,	"	3.7
"	"	5 *m*.,	"	0,	"	2,	"	3.7

Ten years of age, 78, as follows:

	Less than	20 *m*.,	both ears	12,	one ear	3,	making	19.2 %
Of these	"	18 *m*.,	"	8,	"	4,	"	15.3
"	"	15 *m*.,	"	6,	"	3,	"	11.5
"	"	12 *m*.,	"	4,	"	2,	"	7.6
"	"	10 *m*.,	"	1,	"	2,	"	3.8
"	"	5 *m*.,	"	0,	"	1,	"	1.2
"	"	2 *m*.,	"	0,	"	1,	"	1.2

Eleven years old, 83, as follows:

	Less than	20 *m.*,	both ears	6,	one ear	3,	making	10.8 %
Of these	"	18 *m.*,	"	5,	"	3,	"	9.6
"	"	15 *m.*,	"	3,	"	3,	"	7.2
"	"	12 *m.*,	"	1,	"	2,	"	3.6
"	"	10 *m.*,	"	0,	"	1,	"	1.2

Twelve years old, 71, as follows:

	Less than	20 *m.*,	both ears	21,	one ear	10,	making	43.6 %
Of these	"	18 *m.*,	"	14,	"	6,	"	28.1
"	"	15 *m.*,	"	8,	"	7,	"	21.1
"	"	12 *m.*,	"	5,	"	2,	"	9.8
"	"	10 *m.*,	"	5,	"	1,	"	8.4
"	"	8 *m.*,	"	2,	"	2,	"	5.6
"	"	5 *m.*,	"	0,	"	1,	"	1.4
"	"	2 *m.*,	"	0,	"	1,	"	1.4

Thirteen years old, 88, as follows:

	Less than	20 *m.*,	both ears	23,	one ear	9,	making	36.3 %
Of these	"	18 *m.*,	"	16,	"	9,	"	28.4
"	"	15 *m.*,	"	6,	"	7,	"	14.7
"	"	12 *m.*,	"	2,	"	5,	"	7.9
"	"	10 *m.*,	"	0,	"	2,	"	2.2

Carl's College.

Examined in a room about 20 metres long, but in a noisy street. 368 boys were tested.

Nine years old, 72:

	Less than	20 *m.*,	both ears	32,	one ear	2,	making	47.2 %
Of these	"	18 *m.*,	"	6,	"	4,	"	13.8
"	"	15 *m.*,	"	0,	"	1,	"	1.3

Ten years old, 59:

	Less than	20 *m.*,	both ears	26,	one ear	5,	making	52.5 %
Of these	"	18 *m.*,	"	9,	"	4,	"	22.0
"	"	15 *m.*,	"	2,	"	3,	"	8.4
"	"	12 *m.*,	"	0,	"	1,	"	1.6

Eleven years old, 62, as follows:

	Less than	20 *m.*,	both ears	22,	one ear	3,	making	40.3 %
Of these	"	18 *m.*,	"	11,	"	1,	"	19.3
"	"	15 *m.*,	"	1,	"	3,	"	6.4
"	"	12 *m.*,	"	1,	"	1,	"	3.1
"	"	10 *m.*,	"	1,	"	1,	"	3.1

Twelve years old, 54, as follows:

Less than		20 *m.*,	both ears	34,	one ear	5,	making	72.2 %
Of these	“	18 *m.*,	“	14,	“	12,	“	48.1
“	“	15 *m.*,	“	5,	“	6,	“	20.3
“	“	12 *m.*,	“	2,	“	2,	“	7.5

Thirteen years old, 57, as follows:

Less than		20 *m.*,	both ears	32,	one ear	10,	making	73.6 %
Of these	“	18 *m.*,	“	22,	“	9,	“	54.3
“	“	15 *m.*,	“	11,	“	5,	“	28.0
“	“	12 *m.*,	“	6,	“	2,	“	14.0
“	“	10 *m.*,	“	1,	“	0,	“	1.7
“	“	2 *m.*,	“	1,	“	0,	“	1.7

Fourteen years old, 45, as follows:

Less than		20 *m.*,	both ears	28,	one ear	6,	making	75.5 %
Of these	“	18 *m.*,	“	21,	“	6,	“	60.0
“	“	15 *m.*,	“	14,	“	3,	“	37.7
“	“	12 *m.*,	“	3,	“	3,	“	13.3
“	“	10 *m.*,	“	0,	“	2,	“	4.4
“	“	8 *m.*,	“	0,	“	1,	“	2.2

Fifteen years old, 21, as follows:

Less than		20 *m.*,	both ears	16,	one ear	0,	making	76.1 %
Of these	“	18 *m.*,	“	12,	“	1,	“	61.9
“	“	15 *m.*,	“	5,	“	2,	“	33.3
“	“	12 *m.*,	“	1,	“	2,	“	13.3

The so-called Old College.

Examined in a room about 18 metres long in its diagonal; 204 boys present.

The number is too small to have much value, and I therefore give the results all together, and not according to age.

Less than		18 *m.*,	both ears	38,	one ear	19,	making	27.9 %
Of these	“	15 *m.*,	“	6,	“	6,	“	5.7
“	“	12 *m.*,	“	5,	“	5,	“	4.9
“	“	10 *m.*,	“	5,	“	3,	“	3.4
“	“	8 *m.*,	“	5,	“	3,	“	3.4
“	“	5 *m.*,	“	4,	“	2,	“	2.9
“	“	2 *m.*,	“	2,	“	3,	“	2.4

It is remarkable that I found decidedly less boys in the old college who heard badly than in the Carl's College. The reason I do not know, but probably it came from a better general hygienic condition of the former school.

High College.

Examinations made in a room 18 metres long; 120 boys examined as follows:

	Less than	18 *m.*,	both ears	56,	one ear	11,	making	55.8 %
Of these	"	15 *m.*,	"	6,	"	8,	"	12.7
"	"	12 *m.*,	"	1,	"	1,	"	1.6
"	"	10 *m.*,	"	1,	"	1,	"	1.6
"	"	8 *m.*,	"	0,	"	1,	"	0.8
"	"	5 *m.*,	"	0,	"	1,	"	0.8

The relative infrequency of decided defect of hearing in the High College is interesting. In one scholar who heard only at 5 metres (3 metres) with one ear, there was an acute suppurative inflammation of the middle ear, with perforation. This has healed in the meantime, so that at present there is only one boy who hears with both ears at 10 metres (8 metres) to be recorded.

The reason why we find here such a small number who heard badly may be perhaps found in that those who have a chronic bad hearing do not pursue their studies into the higher classes. Nevertheless, we must have further statistics on this point, since the number of my examinations has not been sufficiently large.

Recapitulating the results of all of the foregoing examinations, we see that in quiet localities the whisper is heard at 20–25 metres, simple and short words being chosen. Nevertheless, there were a great many who could not hear at the 20–25 metres; but, at the same time, the condition of their ears did not put them to any inconvenience. It was only when we came to 12–15 metres that they commenced to complain of defective hearing. For this reason I have recorded those children who hear at less than 15 metres as hearing badly. Even some of those who heard very badly were astonished to find that they did not have normal hearing. If they did not understand what people said to them, they accused the people of speaking indistinctly.

But few of the children had ever been under treatment for their ears.

On account of the small size of many of the rooms I could not determine the condition of some with certainty, but when the room was small, all who could not hear the whisper over its entire area were recorded as hearing badly.

In the Eberhard school there were more with defective hearing than in any other ; and even if we make allowance for the noise in the vicinity, over 30% of those present heard badly with one or with both ears.

The other two public schools gave better results, and especially the Stöckach. This probably was due to better dwellings, and also to better conditions in the schools themselves.

The well-ventilated condition of the dwellings of the pupils of the Degerloch public school may also account for their good condition of hearing. The children of both the rich and the poor attend this school.

By inspection of the different results we find that they are better in those schools which are frequented by the better classes, than in those attended by the poorer. If we compare the results of the different ages we find that the younger children hear better than the older, and the frequency of defect of hearing increases with the age of the children (compare, for instance, the intermediate school). I will not discuss these subjects, however, since further examinations seem to be required, but will remark that v. Reichard came to the same conclusions as we have already noted. The results would have been of far greater value had the examinations been made with a more exact instrument for measuring the power of hearing, nevertheless they are important enough to allow us to say that *the ear requires much more attention on the part of physicians and authorities, especially those connected with schools, and also on the part of parents,—than has heretofore been conferred upon it.*

Practitioners of medicine would pay more attention to the ear and its diseases if they were more familiar with the science of otology. It is, however, a well-known fact that they know but little of this subject. Such must be the case, since in many universities it is not taught, and even when it is, students pay too little attention to it, since they are not required to be familiar with it at examinations. It should be required for graduation that the candidate should have some knowledge of the ear, and were this the case, it would soon bring about a different state of affairs in our physicians, and force them to be more familiar with the diseases of the ear and their proper treatment.

It is also of importance for governments to awaken a livelier interest in otology among its surgeons, since there are many patients whose health and usefulness suffer from ear affections, and indeed many who lose their lives, simply by want of knowledge on the part of their doctor.

The reports of health bureaus of the Prussian and Wurttemberg armies for 1874–78 show that during those four years there were removed on account of ear diseases :—

Died	23
Rendered unable to perform duty	1701
Partial invalids	33
Complete invalids	126
Total,	1883

The number of such as are unable to serve in the army on account of their ears must also be large. Then again, many people lose their positions from the condition of their ears, and many of them suffer this loss from a want of proper treatment.

In the schools the ear ought to receive more attention, since good hearing is of the greatest importance to a scholar. Children who hear badly find much more difficulty in following the teacher ; they must therefore exert themselves more, and become tired much quicker. Consequently, they lose their power of attention, particularly when they are absent-minded and not very ambitious.

The difficulty under which such school children labor should not be forgotten by their teachers, since they must have special pains taken with them. Unfortunately some ear affections escape observation, and especially where they are not well pronounced. The sufferers are often misjudged and considered inattentive, and so treated, while they are simply hard of hearing. So thoroughly convinced am I of this that I have always insisted *that every inattentive child should have his ears examined.*

Of course it would be much better if *every school child underwent such an examination once or twice every year.*[1]

It is not necessary that such examinations should be made by a doctor, since the teachers could do it, but of course not so well as a physician.

It does not require much time or trouble, certainly not more than one hour for each class.

The test could be made in the school-room itself if there is no other room convenient; they are generally of sufficient dimensions.

The teacher could place the pupil in one corner of the room, then retire to the other himself, and test each ear separately by whispering.

He should cause the words and sentences used to be repeated by the pupil, and could thus easily find out which of them are hard of hearing. He could seat them accordingly.

Such examinations would have another advantage, viz.: they would call the attention of parents to the condition of their children, and allow them to handle them as they require. This, also, cannot be insisted upon too strongly. It often happens that when a child says "what?" it is considered naughty and reprimanded, without it ever occurring to the parents that the child does not hear well. Many an injustice would be thus avoided, and, moreover, it would cause more children to be put under treatment when it is not too late to benefit them.

Independent of the fact that early treatment generally gives good results in ear diseases, there are many very trivial things which cause a person to hear badly, as wax, etc. This can often be removed in a few minutes by one who understands it, whereas otherwise they would annoy the person concerned for years.

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[1] See also Berzold, *Aerztliches Intelligenzblatt*, 1881, No. 26.

I believe that in the great majority of cases the children whom I examined could be much benefited by proper treatment, and many of them could be entirely relieved in a few minutes. Probably the great majority will never be submitted to proper treatment, or at least not before years, when the disease will have caused changes which can then be but little benefited.

Many of the children will be neglected by their parents even after they have become informed of their condition, simply on account of the cost of treatment. If, however, the authorities would engage a proper surgeon who would be responsible for the proper health of all such institutions, they would be properly treated. It should be the duty of such a surgeon to examine the ears of every child whom the teacher finds inattentive, and, when necessary, to give the proper advice. I believe that such regulations would be of great advantage for the schools and also for the scholars.

A proper education in aural surgery on the part of physicians and regular examinations of the ear would be of great importance to the community, and would also assist in bringing otology into a prominence which it certainly deserves, and of which it is unfortunately still deprived at the present day.

Stuttgart, Jan. 1, 1882.

REVIEWS.

I.

Lehrbuch der Ohrenheilkunde mit Einschluss der Anatomie des Ohres. Von Dr. A. v. Tröltsch, a. o. Professor der Medicin an der Universität Würzburg. Siebente verbesserte und vermehrte Auflage. Mit 24 Holzschnitten im Text. Leipzig: F. C. Vogel, 1881.

Reviewed by A. HARTMANN, Berlin.

(Translated by Isidor Furst, New York.)

In complying with the request of the editors of these ARCHIVES, and giving a review of the recently issued new edition of the text-book of the esteemed author, I do so with the greatest pleasure, believing that thereby a desideratum hitherto existing in our journal will be met. This journal, formerly only the lesser part of the combined ARCHIVES OF OPHTHALMOLOGY AND OTOLOGY, has developed into an independent organ, with the object of furnishing a complete, objectively-drawn image of the continuous development of otology. A review of a new edition of the text-book of v. Tröltsch, could, therefore, not be omitted.

The regularly issued new editions of this excellent treatise may be considered as mile-stones on the progressive road of otiatrics. The author has always understood how to incorporate into his book all newly acquired experience, and to perpetually complete it in this manner.[1] To be sure, we must emphasize the fact that *the appearance of this seventh edition is not identical with the present stage of development of our specialty*, because, as v. Tröltsch remarks in the preface, the manuscript was finished nearly a year before the appearance of the book, and thus little could be utilized of what was published later. For instance, the chapter on "Nervous Deafness" could have gained a material modification and more decided diction by the utilization of the contributions furnished during 1880 respecting the pathological alterations in the labyrinth; of Politzer's articles on otitis labyrinthica, and the condition in syphilis; of those of Moos on changes in the labyrinth in hemorrhagic pachymeningitis; on nerve atrophy in the first cochlear convolution by Moos and Steinbrügge.

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[1] We feel, however, constrained to point out that v. Tröltsch makes his supplements from the *Archiv für Ohrenheilkunde* only, so that the contributions which have appeared in other journals are only cited according to the extracts contained in that *Archiv*.

The reviewer believes he may omit a more detailed discussion of v. Tröltsch's book, as its contents are too well-known to require a close analysis. The alterations found in the new edition, as compared with the old, are, on the whole, not great. The chapter on the importance of diseases of the ear and on the position of otology in science, which has already appeared in the *Archiv für Ohrenheilkunde*, forms the introduction. Three new anatomical illustrations, borrowed from the author's "Krankheiten des Ohres im Kindesalter," have been added to the text.

The growth of the author's book from small beginnings until it now comprises 664 pages corresponds to the ever-increasing development of otology. It appears to us questionable whether the statement contained in the preface to the first edition, that all exensive anatomical discussions have been omitted, is still true for the present edition. We point, for instance, to the sections referring to the height of the auricle in embryos, on the growth of the membrana tympani in the fœtus, contained in the first chapters. The absence of the hole of Rivini is very fully discussed; while, on the other hand, the anatomy of the labyrinth is treated very briefly, and the reader referred, strange to say, in just this most difficult part of the anatomy of the ear, to the manuals. Particularly appropriate, and corresponding to a requirement in practice, appears to be the full description of the anatomical relations of the external auditory meatus to its surroundings.

We need not emphasize the masterly representation of the morbid processes in the outer and middle ears in v. Tröltsch's text-book. The respective chapters are elaborated with the greatest care, and are based on the most ample practical experience. Among the affections of the external meatus, perhaps the osseous occlusion, brought about by an acute inflamatory process, as described by Moos, might have been mentioned.

As regards the classification of the affections of the middle ear, we encounter in v. Tröltsch's book the same difficulties which are likewise found in the other text-books of otology. The author divides acute inflammation of the middle ear into an acute *simple* catarrh of the ear, and an acute *purulent* catarrh, or acute otitis media—two affections differing not in their nature, but only in the intensity of their occurrence. On the other hand, in the long chapter, "Chronic Simple Catarrh of the Ear," the ("sit venia verbo") dry catarrh, the sclerosis of the mucosa of the drum cavity, also the accumulations of exudations, the processes of adhesion, and the affections of the tubes, are described together. The exudative catarrh of the ear of children, which we only know from *post-mortem* appearances, is perhaps treated rather too fully (pp. 21).

In the sections on the ear-trumpet and on the air douche, several more positive supports would have been yielded by mentioning the results of the manometric determination of the patency of the Eustachian tube and the power of resistance of the soft palate.

Inasmuch as the author of a book, in our opinion, cannot care to receive in its review nothing but flattering terms of praise, we have undertaken to point out at least a few facts that struck us on reading the book, and which we believed could be taken into consideration in a subsequent edition. We hope that our remarks will be accepted as being to the point and not as carping criticism ; the latter would be out of place with a book which will retain a lasting position in the history of our specialty, and the merits of which in the spread of otology must remain unquestioned.

II.

Imperfect Hearing and the Hygiene of the Ear, including Nervous Symptoms, etc. By Laurence Turnbull, M.D. Third edition, with illustrations. Philadelphia: J. B. Lippincott & Co., 1881.

Reviewed by A. HARTMANN, Berlin.

The author, who has done much for the spread of otology in the United States, in the introduction to his monograph which has appeared in its third edition, gives a brief synopsis of the progress of otology.

In the *first chapter*, the limits of perception of musical tones are discussed according to Blake's and his own experiments. Two of the persons tested by the author perceived tones of 60,000 vibrations, a great number heard those of 50,000 vibrations; the extreme limit of tones which were always recognized by those with normal hearing were those of 25,000 vibrations. By practice the ear can be educated to perceive higher tones which were formerly inaudible.

In the *second chapter*, the author submits his views on tinnitus and aural vertigo, together with their diagnosis and treatment, with the addition of a considerable number of case reports. Attention should be called to the fact that Turnbull places a particular value on a good preparation of hydrobromic acid. While he formerly had no result from this remedy, he succeeded after he provided himself with a good sample, on the advice of Woakes. The mode of preparation is given.

In the *third chapter*, the importance of the treatment of affections of the naso-pharyngeal space is discussed. As regards adenoid proliferations, the author did not succeed in seeing characteristic cases during his sojourn at Vienna, Paris, and London, and therefore considers them very rare; according to the author, hypertrophies of the tonsils are by many designated as adenoid proliferations.

In the *further chapters*, Turnbull expresses his opinions on artificial perforation of the membrana tympani, on the mastoid region and its diseases, on the hygiene of the auditory apparatus, and illustrates his explanations with many instances from his practice. Of special interest to us were the author's communications respecting deaf-mute instruction in America (chap. VII), and the discussion of the favorable results obtained in some institutions.

The *last chapter* contains a comparison between the audiphone, dentaphone, and the various forms of ear-tubes. Turnbull emphasizes that a great number of patients coming to him for the purpose of trying the various instruments for the amelioration of hearing, were so far improved by the treatment of the causative affection that they wished for no further trial of the instruments.

Any one into whose hands the author's book may come will find it pleasant reading. We express our obligation to him for his untiring efforts to establish the importance of otology, and to make it the common property of the profession.

III.

Der Chronische Nasen- und Rachencatarrh. Eine klinische Studie von Dr. Max Bresgen in Frankfurt a. M. Wien and Leipzig : Urban & Schwarzenberg, 1881.

Reviewed by A. Hartmann, Berlin.

In the present monograph, the author gives a pretty thorough description of chronic catarrh of the nose and pharynx, especially in relation to etiology, symptoms, and course. To characterize at once the impression made upon us by the work, it seems to us that the personality of the author is somewhat too prominent ; he expresses himself very positively as to his own experience, and at the same time lets the experience of others appear in an unfavorable light. Whether he will thus succeed in convincing the reader that his is the best and most correct must remain an open question ; to us it does not seem so. At any rate, Bresgen would have attained his object in a better manner if he had presented more positive facts, and had stated whether and how he had tested the experience reported by others, instead of merely asserting: this and that I did not find useful, I dispute, failed with me, etc.

It must produce a somewhat startling impression when the author, for instance, expresses himself respecting Zaufal's funnels, that he cannot recommend them at all; and that he warns every one not to purchase them, after the utility of these funnels has been acknowledged by many reliable observers. A similar unfavorable opinion is advanced by Bresgen on Voltolini's palate-hook, which likewise is employed by many practitioners with advantage.

As regards the etiology of chronic nasal catarrh, it appears to the author, in harmony with other observers, indubitable that it may arise from the acute catarrh by frequent relapses. In the catarrh of children, which is chronic from its inception, Bresgen has always found scrofulosis as the basis. Bresgen disputes emphatically that syphilis is one of the predisposing causes of chronic nasal catarrh. "I maintain rather that syphilis localizes itself only in noses already in a catarrhal state." The habitual use of snuff is looked upon by Bresgen as decidedly the most important etiological factor of chronic nasal catarrh.

Bresgen does not think it appropriate to distinguish different forms of pharyngeal catarrh, but that it is more correct to speak of a single chronic pharyngeal catarrh only. He has never yet seen a chronic pharyngeal catarrh without the mucous membrane of the lower pharyngeal section being more or less strongly granulated. The pathological condition he believes to be congenital, and the disease inherited. The hereditary disposition is the more intense, the more pronounced and the more numerous the granulations on the pharyngeal mucosa are found.

In the section, "Symptoms, condition, and course of chronic nasal catarrh," ozæna is discussed in full detail. It strikes us that the author here does not sufficiently separate the simple chronic catarrh, blennorrhœa, and ozæna in the sense of Michel, Zaufal, Gottstein, and others, which fact may explain why he believes not to harmonize with the views of other writers. As regards Störk's so-called chronic blennorrhœa of the mucous membrane of the nose, larynx, and bronchi, it should hardly be interpreted as an independent disease. The material difference which is said to exist between ozæna and Störk's disease—the ever-present intense implication of the larynx and trachea in the latter—does not appear to the reviewer to be convincing, because we find frequently enough also in ozæna an implication of the larynx and trachea.

The therapeutics which Bresgen employs in chronic nasal catarrh consist in the application of the nasal douche with the piston syringe; the usual injections are thrown in lukewarm. Especially recommended are insufflations of powders composed of silver nitrate: 0.05–0.1 gramm. in starch, grammes 10.0. Bresgen believes this treatment with silver nitrate insufflations to be also in ozæna far more agreeable to the patient than Gottstein's nasal tamponade.

In the treatment of pharyngeal catarrh, Bresgen rejects brushing with lunar caustic solutions, inhalations, gargles, and the silver nitrate stick. In the main, Bresgen's treatment consists in the galvano-caustic destruction of the granulations of the pharyngeal mucosa. Besides, Bresgen states, in connection with the discussion of hyperæsthesia of the pharyngeal mucous membrane, that the latter can be best overcome by the treatment of the chronic pharyngeal catarrh. He obtained the quickest result by brushing with iodized glycerin: iodi puri, 0.5–1.0 gramme; potassii iodidi, 2.5–5.0 grammes; glycerini, 25.0 grammes.

IV.

Die Krankheiten des Ohres und deren Behandlung.

By Dr. Arthur Hartmann. Kassel, 1881. 210 pages, with 34 wood-cuts. (Price 5 mark.)

Reviewed by G. Brunner, Zurich.

Although there is certainly no lack in German literature of text-books of otology, Hartmann's work really supplies a want, for (since 1866) no second edition has appeared of Moos's "Klinik der Ohrenkrankheiten," and the compendium of Tröltsch in Billroth and Pitha's "Chirurgie" is in many respects rather too brief. On the other hand, the text-books of Tröltsch, Gruber, Politzer, Urbantschitsch are too extensive for the beginner and confuse him frequently by the many details; the price is also correspondingly much higher. In regard to the general arrangement, I can only express myself in praise. Hartmann obviously has understood to separate the essential from the unimportant; the book also affords pleasant reading, and the get-up is first-class. The anatomy is restricted to what is most necessary. A brief historical synopsis and three chapters on general diagnosis, symptomatology, and therapeutics, have been put before the special part, for which arrangement the beginner will be grateful. The other seven chapters treat of special pathology and therapeutics with a completeness and detail fully sufficient for a compendium.

Although the reviewer holds that it would be conducive to that unanimity of opinion which is still lacking on many, especially therapeutical points, if such treatises of the entire specialty were thoroughly discussed by a great number of confrères on the basis of their personal experience, he must here confine himself to a few remarks, as such a detailed review would far exceed the room assigned me.

To the disputed points belong, among others, the important primary treatment of acute otitis media, in regard to which I do not quite coincide with Hartmann. Namely, when he says (p. 114) that the general principle, that the use of cold limits inflammation and that heat increases it, cannot be applied to the ear, and that the condition of the patient would rather be made worse by the cold acting directly on the ear, I am constrained to contradict him on the strength of many years' experience. I maintain that the correctly applied ice-bag, conjoined with rest in bed and careful regimen, is the most effectual means in our anæmic times which are unfavorable to the abstraction of blood, and I know of hardly any disease in which strict antiphlogosis ab initio proves itself as effective as in this. The inflow of cold water into the ear which is feared by Hartmann can be prevented by any careful practitioner; nor will iced compresses be laid upon the ear, but a completely closed ice-bag which should not be too large, and the effects of which can be moderated to any degree by an interposed dry compress of variable thickness. Hartmann combines heat and cold in such a manner as to have warm infusions poured into the meatus or warm sponges (!) laid upon the ear; while in front of and below the ear cold applications or a small ice-bag are to be applied. To be sure, by the latter the injurious influence, *per se*, of the heat is more or less neutralized, but I should think it more rational and better to entirely omit the heat, which favors hyperæmia and formation of pus.[1] Moreover, I should have wished that Hartmann would have laid greater stress upon the utility of rest in bed, not only "in purulent inflammation with fever."

I was well pleased with the chapter on foreign bodies in the ear, in which the syringe is praised as the sovereign remedy above all others, and a special warning given against the use of forceps and instruments in general, without ample assistance and illumination. Would that the general practitioner heed this at last!

It is incorrect to ascribe a corium to the drum membanes (p. 90); the mucosa of the drum, too, has a ciliated cylindrical, not a ciliated pavement epithelium and no glands.[2]

The domain of acute idiopathic myringitis, in my opinion, should be still more limited than is usually done and also by Hartmann; the distinguishing feature as compared with the slighter forms of acute otitis media, namely that the hearing is less impaired in the former, I find to be insufficient. Although it is generally assumed that labyrinthine pressure rises in occlusion of the tube and consequent rarefaction of the air in the drum cavity, the opposite is the case, according to Politzer's experiments on fresh specimens: labyrinthine pressure decreases, because the lessened pressure at the fenestra rotunda (provided its membrane is movable) more than compensates for the positive pressure at the fenestra ovalis.

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[1] Other authors, such as Politzer, do not seem to employ cold at all; the latter, although he states cataplasms and warm fomentations to the meatus to be injurious, recommends "moist warm poultices to the region of the ear," covered with oiled silk, as particularly efficacious. And in Kunigk's Vademecum (Leipzig, 1880) we find on the treatment of acute otitis media, "Beware of quite cold and hot applications"; that is to say, the *juste milieu*, characteristic of the impression produced on laymen by the diverging opinions of the profession.

[2] Compare my contributions to the anatomy and histology of the middle ear.

In concluding, I heartily commend Hartmann's book to all beginners in otology as well as to the general practitioner; it gives them, in pleasant brevity, a faithful picture of the present state of otology.

V.

The Human Ear and its Diseases: A Practical Treatise upon the Examination, Recognition, and Treatment of Affections of the Ear and Associate Parts, etc. By W. H. Winslow, M.D., Ph.D., Oculist and Aurist to the Pittsburgh Homœopathic Hospital, etc., pp. viii, 526. N. Y. and Phila.: Boericke & Tafel, 1882.

Though emanating from a practitioner who styles himself homœopathic, this work contains nothing indicative of this fact, except suggestions as to internal medication. External medication differs in no particular from that recommended in our standard text-books on otology. The anatomy of the ear and its appendages is very fully considered and illustrated by wood-cuts, which are, in most cases, credited to Dr. C. H. Burnett's treatise, but which are for the most part from Gruber or Henle. None of the illustrations in the work—of which there is an abundance—are original. In fact, there is nothing in the treatise which is original, but the views of others are put forth, as a rule, with clearness and correctness, and the work may be taken as representing fairly the status of otological symptomatology and diagnosis. As to treatment, it represents one side or the other of the opposing camps, and is sometimes as heroic as the most ardent allopath (so-called) could wish.

Having been during the late war a naval officer, he was in a position to judge of the effects of heavy cannonading in the ears. His experience corresponds with that of Gruber, that rupture of the drum-head from this cause is extremely rare.

He believes in the frequent occurrence of affections of the ear of a painful nature from carious teeth. He also recommends the long tabooed poultice in inflammations of the external auditory canal or drum cavity. Considerable space is given to the consideration of diseases of the nose and pharynx, in their connection with ear disease.

One chapter is devoted to electricity in aural disease, with an evident belief in its value. In this, however, we are inclined to believe the author stands almost, if not quite alone. The evidence of some of the most careful and conscientious observers goes to show that electricity is of little benefit in any form of ear affection.

The chapter on the affections of the internal ear is very obscure and unsatisfactory, though perhaps not more so than our actual knowledge of the subject.

S. M. BURNETT.

REPORT ON THE PROGRESS OF OTOLOGY IN THE SECOND HALF OF THE YEAR 1881

(July to November.)

I.—NORMAL AND PATHOLOGICAL ANATOMY OF THE ORGAN OF HEARING.

By H. STEINBRÜGGE, Heidelberg.

Translated by Isidor Furst, New York.

1. W. Kirchner. Würzburg. Beitrag zur Topographie der äusseren Ohrtheile, mit Berücksichtigung der hier einwirkenden Verletzungen. (Contribution to the topography of the external parts of the ear, with reference to injuries acting upon them.) (Habilitationsschrift.) *Verhandl. der phys. med. Gesellsch. zu Würzburg.* N. F., Bd. xvi.

2. Max Flesch. Privadocent and Prosector at Würzburg. Kleinere Beiträge zur normalen und pathologischen Anatomie des Gehörorgans. (Minor contributions to the normal and pathological anatomy of the organ of hearing.) *Arch. f. O.*, Bd. xviii, H. 1 and 2.

3. Oren D. Pomeroy, New York. A case of intracranial myxosarcoma destroying the whole of the organ of hearing, bursting through the external parts, and forming a large tumor which depended from the ear. *Amer. Journ. of Otology*, vol. iii, No. 2.

4. Schäfer. Ein Fall von Herderkrankung des Schläfenlappens. (A case of circumscribed affection of the temporal lobe.) *Centralbl. f. Nervenheilkunde*, 1881, No. 3. Reviewed by Wernicke in *Centralbl. f. d. med. Wissensch.*, 1881, No. 38.

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1. The author, in the preface, deals first with the forensically important questions, whether previous to a traumatic injury of the

organ of hearing there existed anomalies of development or morbid alterations; whether an originally unimportant injury, by the supervention of accidental deleterious circumstances, had been succeeded by grave results to the ear, or eventually to health and life. Then follows the discussion of lesions of the auricle and the introitus of the meatus, in which connection it should be pointed out that the symptoms do not always correspond with the extent of the traumatic influence, violent symptoms often appearing after even slight injuries. This is succeeded by the consideration of othæmatoma. The author treats this affection by a free incision and antiseptic dressing. Concerning the influence exerted by destruction of the auricle, its form and position upon the hearing power, KIRCHNER has convinced himself both by clinical and experimental observations that the factors named are of subordinate importance for the acuteness of hearing. Of importance are only stenosis or adhesions at the auditory introitus which remain after the healing of cartilaginous defects. Then follows the description of the cartilaginous and osseous auditory canal, the statement of the relative sizes, the various curvatures (v. Bezold: spiral twist), which latter furnish some protection to the drum against the entrance of injuring instruments. Lesion of the anterior cartilaginous wall of the ear canal, however, may implicate the parotid gland; that of the posterior wall, the mastoid process. The author reports a case of injury to the inferior, and one to the posterior upper wall, and calls to mind the traumatic case described by Moos (wound from a knitting needle), which was succeeded by an abscess of the parotid gland. Then follows the discussion of the injuries which affect the osseous meatus; in the first place those of the anterior lower wall. The anatomical conditions which are to be considered in this connection are: the defect of ossification in the anterior wall, persisting to the fourth, rarely to the sixth year of life, and even later appearing to be closed only by a thin lamella of bone; the wedge-shaped, vertical prolongation of the tegmen tympani which subsequently inserts itself between the anterior wall of the os tympani and the posterior wall of the glenoid fossa, thus producing two fissures, one of which leads into the skull cavity as the continuation of the petroso-squamous fissure, the other into the drum cavity as the petro-tympanic fissure and sometimes communicates also with the external auditory canal. Moreover, a sinus occasionally extends to the expanse of the petroso-squamous fissure which dates from the fœtal period of development of the jugular veins, sometimes emptying into the lateral sinus or else connecting with the deep temporal veins. Even without fracture of the bone, inflammatory processes after traumatic lesions may extend from without to the middle ear through the above-described fissures, as well as through the intervention of connective-tissue trabeculæ and vessels. Furthermore, there enter into consideration here the concussions affecting the lower maxilla and the erosion of the anterior wall of the auditory meatus through the pressure of the condyle. Then follows the report of two cases of implication of the anterior lower wall of the auditory canal after violence to the lower jaw, with subsequent separation of small sequestra. In the first case, after some time, perforative otitis media supervened ; in the latter, a slit-like stenosis remained. In regard to the upper wall of the auditory canal, the various relations of magnitude, angular position toward the vertical pars squamosa, from birth to the completed growth of the skull, are treated of ; the importance of the spina supra meatum is discussed, while in the remainder the cellular spaces are noted which separate the upper wall from the central cavity of the skull, communicate posteriorly with the mastoid cells, and extend anteriorly as far as the zygomatic process. Moreover, in the adult, in the inner half of the osseous meatus, posteriorly the vicinity of the mastoid antrum (which in the child is situated more externally) enters into consideration ; antero-superiorly, however, the region of the malleo-incudal joint, which is separated from the ear-canal by a thin plate of bone merely. In connection with the posterior wall of the osseous meatus, mention is made of the tympano-mastoid fissure, also of the defects and attenuations of the bony septum, as well as the connective-tissue trabeculæ and vessels which connect with the mastoid cells ; then follow the dehiscences described by Zuckerkandl, and finally the sclerosis of the mastoid process. Three cases of his own are reported, being injuries of the posterior wall of the auditory canal with subsequent discharge of small sequestra; and Toynbee's case of meningitis after lesion of the ear canal by a pin is mentioned. In conclusion, the author in a few sentences recapitulates his experience in lesions of the auricle and the auditory meatus.

2. Since his previous communication on dehiscences of the tegmen tympani, FLESCH, in making dissections, directed his special attention to these conditions, and has become convinced

that real defects of bone are of rare occurrence ; that after carefully detaching the dura mater a thin plate of bone almost always remains behind at the respective spots, which of course may be easily injured during the maceration of the skull. For that reason, statistics concerning dehiscences should not be based on macerated skulls.

In a second communication, a case of stenosis of the inner auditory meatus in consequence of a general hyperostosis of the skull is reported. (Female, æt. 25, sudden death ; fatty degeneration of the heart ; auditory disturbances or hallucinations were not observed during life.) The petrous bone in question was thicker than normal ; the internal ear canal forms a transverse fissure which in its central part widens a little (1.5 *mm.* in height) ; the hiatus of the Fallopian canal invisible ; the deep groove for the superficial major petrosal nerve medially changed into a canal ; the depression for the superior petrosal sinus obliterated. The examination was made on a macerated skull.

3. The case occurred in a girl of six years. For ten weeks convergent strabismus in consequence of paralysis of the left abducent nerve. Diplopia. Right, chronic catarrh of the middle ear ; left, a small polypus proliferating from a perforation of the membrana tympani. Acuteness of hearing, especially on the left side, very much diminished. Tuning-fork perceived on the left. No fever. Removal of the polypus. Pain in the left eye and ear. Somnolence ; later, oculo-motor paralysis (left) and hyperæmia of the optic nerve. Tremors in the extremities and considerable fluctuations in the frequency of the pulse. After ten weeks, profuse left-sided otorrhœa ; a soft tumor in the ear canal, which was removed. Symptoms of paralysis of the facial nerve. Subsequently, a rapid recurrence of the tumor ; it opens close behind the ear lobe and in front of the tragus. Severe cough a few days before death. Autopsy : the tumor had destroyed the labyrinth and the inner two thirds of the pyramid, had perforated the dura mater in two places, but had not materially implicated the brain. The perforation outward had occurred anteriorly between the large wing of the sphenoid bone and the squamous suture ; posteriorly at the junction of the temporal bone with the occiput. The left superior petrosal sinus, lateral sinus, and carotid canal obliterated. The microscopic examination of the vascular, variously honeycombed tumor showed spindle-shaped, stellate, round, and polyhedral cells in the structureless, granulated, partly deli-

cately fibrillated interstitial tissue (myxosarcoma). A part of the tumor contained numerous ganglion cells, medullary and non-medullated nerve fibres, probably from Gasser's ganglion, and the author therefore supposes that the tumor originally sprang from the region of that ganglion. Another kind of peculiar granulated cells enclosed in a capsule, with large, irregular nucleus, are interpreted by the author, of course with some reservation, as young ganglion cells, while the description and also the illustration seem rather to indicate cartilage cells. In conclusion, the author cites the cases of sarcoma in the region of the auditory organ reported in literature.

4. A paralytic in Mendel's institution suffered an apoplectic seizure which was succeeded by left-sided hemiplegia. Eleven days subsequently, he always turned the head toward the right when addressed from the left. This phenomenon lasted eight days.

Five weeks later, a second apoplectic attack, with right-sided hemiplegia, followed by the same state of sound-perception, but reversed. This phenomenon likewise ceased in eight days. Death four months later. At the autopsy were found, besides the diffuse alterations characteristic of progressive paralysis, a concretion of lime in the right third temporal convolution, and the author believes that the deposit must have struck that part in the expansion of the left acoustic nerve which effects the localization of the acoustic impressions.

II.—PHYSIOLOGY OF THE ORGAN OF HEARING AND PHYSIOLOGICAL ACOUSTICS.

(JULY TO NOVEMBER, 1881.)

BY OSCAR WOLF, FRANKFORT-ON-THE-MAIN.

(*With two wood-cuts.*)

1. C. SPAMER. Kreisassistenzarzt in Mainz: Noch einige Worte zur Frage der Function der halbkreisförmigen Canäle des Ohres. (A few more words on the question of the function of the semicircular canals in the ear.) 4 pp. *Pflüger's Archiv für die gesammte Physiologie*, Bd. XXV, p. 177-181.

2. VICTOR URBANTSCHITSCH, Vienna: Ueber das An-

und Abklingen acustischer Empfindungen. (On the beginning and the termination of auditory sensations.) *Ibid.*, pp. 323-342.

3. Herrmann Munk, Berlin. Ueber die Hörsphären der Grosshirnrinde. (On the acoustic centres of the cerebral cortex. Lecture.) From the *Monatsbericht der Königl. Akademie der Wissenschaften zu Berlin*, May, 1881, 15 pp.

4. Wilhelm Moldenhauer, Leipzig. Zur Physiologie des Gehörorganes Neugeborener. (Contribution to the physiology of the organ of hearing in the new-born.) Beiträge zur Geburtshilfe, Gynäkologie, und Pädiatrik, gewidmet dem Herrn Geh. Medicinalrath Dr. Crédé, Leipzig, published by Witte, printed by Engelmann, 1881, pp. 199-204.

5. Edouard Fournié. Médecin de l' Institut National des Sourds-Muets a Paris: Physiologie des sons, de la voix, et de la parole. *Revue médicale française et étrangère*, 8 Oct., 1881, 61 e année, pp. 505-513.

1. At the same time when the reviewer[1] laid down in these Archives the objections he held against Baginsky's conclusions, Spamer likewise maintained, in the present reply, his standpoint concerning the question of the *functions of the semicircular canals.* He, too, does not admit that the non-occurrence of disturbances of equilibrium in complete destruction of the labyrinth invalidates Goltz's doctrine; for Spamer is also of opinion that irritation alone, not the destruction of the semicircular canals, is capable of producing permanent disturbances of equilibrium; it is again pointed out that in numerous cases the dissection of the test-animal showed absolutely nothing abnormal in the brain and its meninges. But Spamer agrees with Baginsky that the *turning of the head* should be considered as the consequence of a secondary inflammation of the cerebellum.

Spamer then cites a number of reasons directed against the opinion of Baginsky, that the disturbances of movement which immediately succeed every lesion of a semicircular canal are solely the consequences of the thus effected outflow of cerebrospinal fluid. For instance, the described disturbances of equilibrium occur even after the introduction into the osseous canal of the red-hot point of a nail.

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[1] Compare these Archives, vol. x, No. 3, p. 249.

2. In continuation of his studies "on sound-perception," URBANTSCHITSCH furnishes us experiments on the *beginning and termination of auditory sensations.*

The complete formation of an acoustic impression requires a certain time, in the same way as has been proved concerning light impressions by Plateau, Brücke, and Exner. An acoustic impression, too, attains its full intensity, commensurate with the objective sound, proportionately later as the acoustic irritation is weaker.

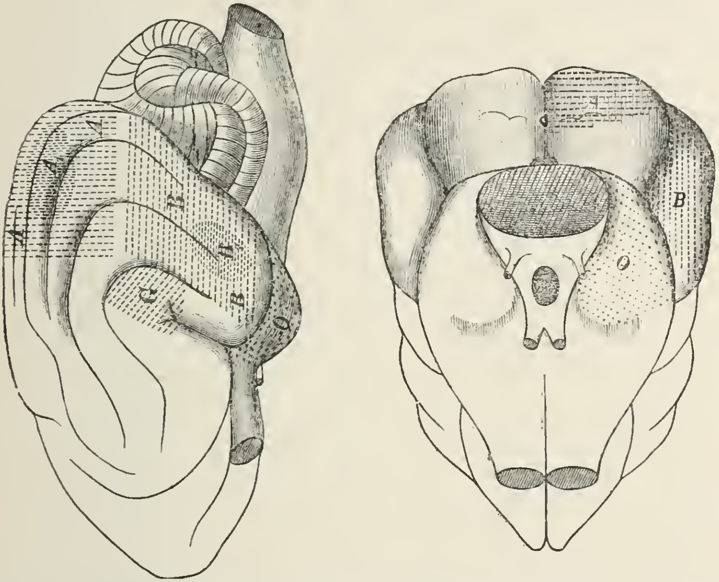
The effectuation of an acoustic sensation requires, in cases of minimal irritation, from one to two seconds or over; if, however, the several tests succeed each other rapidly, the state of irritation incited by the preceding test causes a quicker production of the auditory sensation.

Even in those with normal organs, but more strikingly in those with unilaterally impaired hearing, often a *retarded* perception of sound may be demonstrated in either ear if a source of sound is simultaneously conducted to both ears by means of a three-armed otoscope. Such persons sometimes perceive loud tuning-fork tones or the ticking of a watch up to ten seconds later on the diseased ear, and thus occurs the *echo-like* phenomenon (which has been repeatedly described by otologists, but which has not hitherto found a sufficient acoustic explanation—Rev.).

For the experiments on the *termination of auditory sensations* Urbantschitsch employed a pendulum apparatus, by means of which the tone of a tuning-fork can be conducted to the person tested in accurately determinable intervals. Helmholtz's view was confirmed, that high tones die away more rapidly than low ones.

3. Prof. MUNK, in his lecture, first recalls to mind the experiments on the acoustic centre which he performed during 1876 and 1877, and which offered so many difficulties. In consequence of the bilateral extirpation of a *certain portion of the temporal lobe* (part B[1] in the figure), the dog in question was "soul-deaf," *i. e.*, he still heard, but had lost the memory images of sound, he understood no longer what he heard; the animal, however, gradually again learned to understand what he heard, and four or five weeks after the operation he appeared the same as before. Accordingly, the small extirpated part of the cerebral cortex must appertain to a larger acoustic centre serving for the perception of hearing, the entire destruction of which should lead us to

expect complete deafness. Munk really succeeded in removing[1] from several animals (dogs) bilaterally the parts of the cerebral cortex marked BB^1B in the cut, in keeping the animals healthy for from two and a half to four months, and in utilizing them for acoustic tests.



AA^1A, Visual centre. *BB^1B*, Acoustic centre. *G*, Otic region of the tactile centre. *O*, Olfactory centre in the gyrus hippocampi.

The result is in two directions highly important, even fundamental. For Munk found that those animals in which both acoustic centres were destroyed became completely deaf and gradually also dumb. The author describes the behavior of animals thus operated upon, in the following manner.

"As soon as the narcosis after the second operation has passed off, the dog walks and runs about in a lively manner, and after a few days, when the moderate fever has subsided, he behaves like a healthy dog, plays and romps with his fellows. In the execution of bodily motions, as well as in the variety of actions, he presents no manner of deviation from the normal. His vegetative functions, too, are all normally performed, and seeing, smelling, tasting, feeling, are also perfectly normal. But the dog is deaf, completely deaf on both ears. While formerly the slightest uncommon noise attracted his attention and caused movements, we now may call, scream, make noise as much as we please; we may make music, whistle, and beat the gong until it becomes intolerable not only to men but also to the other dogs; his mates may bark alone or in terrific concert and howl; none of that, as long as nothing uncommon strikes his eye, will in the least disturb his equanimity; whether lying, standing, or walking, with no motion of any sort does he react to the sound; even the auricles, which otherwise frequently move to and fro whenever he looks at any thing attentively, remain perfectly quiet. Withal, the intelligence of the dog appears to be no further impaired than would be natural to the deafness; and by diligent spying about and by attentive gazing at the men on whom he is dependent, he seems to some extent to make up for the loss sustained by the deafness. Thus the dog remains unchanged, as long as he lives and keeps healthy, except that the deafness becomes associated with deaf-mutism. Already in the first week he always barks only for a brief period, in a rather peculiarly hard and monotonous manner, occasionally discordantly; later, he bays only for some seconds quite faintly and roughly, often hoarsely; finally, in most cases after two weeks, he no longer attempts to bark. While the noise at the door, the stranger in the stable, the passer-by at the railing of the yard set the whole pack of dogs barking; while his mates at play with him accompany the merry bounds, at fight with him for the meat or the slut in heat, supplement the spiteful bites with barks—all through our dog remains mute; and were it not that ill-treatment made him yelp and howl, we might think him to be voiceless. Otherwise, in the two and a half to four months during which I could observe these dogs in perfect health, nothing noteworthy occurred."

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[1] The operation was first performed on one hemisphere, and one or two months later, when the wound had healed, in like manner on the other hemisphere.

A second fact deducible from Munk's experiments is, that a decussation of the fibres of the acoustic nerve occurs in the brain. Namely, if after totally extirpating one acoustic centre, the organ of hearing of the *same side* is destroyed by breaking away the lower cochlear wall, the dog thus treated becomes completely deaf and soon also deaf-mute, and he corresponds exactly in his behavior with those dogs both of whose acoustic centres had been extirpated or both of whose auditory organs had been destroyed.

Previous to the second operation—the breaking away of the lower cochlear wall—the dog in question, after sound impulses, had erected the ear on the injured side exclusively, or invariably turned the head first in that direction.

Finally, the experimenter could demonstrate, after incomplete removal of the acoustic centres, *i. e.*, if the anterior or posterior portion of the particular cortical substance was left behind, that the dog operated upon did not hear some series of tones, while others were well perceived. Munk does not undervalue the difficulties encountered in testing analytically the hearing of animals, but believes himself justified in announcing as a certain result that the *posterior part* of the acoustic centre in the neighborhood of the cerebellum serves for the perception of *low tones;* that the *anterior part*, near the fossa Sylvii, serves in the perception of *high tones.* Where, perhaps, only the anterior third or less of the acoustic centre was preserved, the dog did not hear the tones of low organ pipes C^{-1} and c^0, nor the call in deep base, nor low noises in general, and especially not the deep loud noise produced by short knocks against the centre of the gong. Inversely, where only about the posterior third of the acoustic centre was preserved, the dog did not hear the whistle, nor the tones of high pipes (c^2, c^4, $c,^5$), nor the high call in falsetto.

Munk besides thinks it probable that the ordinary and everyday hearing of the dog is mainly confined to the lower half of the acoustic centre. For where only about the lower third of the acoustic centre was preserved, the dog apparently heard every thing, even if he did not understand the call, and barked as before ; on the other hand, where only about the upper third of the acoustic centre was left, the dog heard badly in general, reacted to the various tones and noises but little, and sometimes not at all ; and barked only for a short time, and rarely.

Munk has been unable to demonstrate that the perception of *single* tones and noises was entirely lost.

4. MOLDENHAUER has tested, in Crédé's clinic, the perceptive capacity of fifty children of the ages from one hour up to five or more days. In the majority of cases, the investigations were undertaken with full-term children ; but some tests were also made with children three or four weeks premature ; the experimenter was unable to demonstrate any difference in the perceptive capacity between full-term and premature children. The source of sound was the "cricri," which is well known to give an exceedingly sharp tone disagreeable to the ear of adults.

The examinations led to the result that, with very few exceptions, the children plainly reacted to the sound immediately at the first test. To be sure, the intensity of the reaction was often exceedingly variable, not only in different individuals, but in the same child on several days, and under varying conditions. Beyond the second day the reaction ensued decidedly more promptly and distinctly than during the first days ; from the third day on, an essential increase could not be certainly demonstrated for the first week of life. As regards the manner and the degree of the reaction, the reflex movements of the child lying quietly in front of the experimenter varied from distinct trembling of the eyelids to a corrugation of the forehead, and once a single brief turn of the entire head. In the higher degrees the picture was that of an individual seized with great terror. Sleeping children awoke, and frequently commenced to cry. But the excitability on impressions of sound very soon decreased after oft repeated experiments, so that a blunting or habituation even to entire absence of reaction ensued.

In conclusion, Moldenhauer states that new-born children undoubtedly have a sensation of intense impressions of sound, but leaves it undecided whether this sensation can be considered as one of hearing or of pain. For Politzer had assumed[1] that the acoustic nerve contains fibres which do not serve for the perception of sound, but which are likewise excited by sound waves, and provoke impressions of pain. If we bear in mind that the piercing tone of the " cricri " produces even in adults a very disagreeable, almost painful impression, the possibility of a similar sensation in the new-born cannot be denied. In the Reviewer's opinion, Moldenhauer might have employed, on account of these doubts, other modes of testing which do not produce painful sensations ; among others, deep and medium tones of flutes, clarionets, or bassoons would certainly have proved advantageous for these experiments ; with a little practice it is not difficult to produce an equal intensity of tone with wooden wind instruments.

Altogether, in Moldenhauer's experiments with the cricri, the possibility is not excluded that the above reflex movements were effected through an irritation of the sensitive fibres of the trigeminus in the external auditory meatus. Compare Moos : Ueber den Zusammenhang zwischen Krankheiten des Gehörorgans und solchen des Nervus Trigeminus, *Virchow's Archiv*, Bd. lxviii.

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[1] *Lehrbuch der Ohrenheilkunde*, p. 229.

5. Fournié, in the present treatise, first calls attention to the two well-known theories of voice-formation : the former explains the production of tones according to the mechanism developing the tone at the mouth-piece of an organ pipe ; the second assumes that the process of tone-formation resembles that at the membranous reeds of wind instruments, in which the entire reed is set vibrating (Joh. Müller). Fournié holds both theories to be erroneous, and attempts to prove by experiments that the tone arises essentially from the vibrations produced by the current of air in the folds of the mucous membrane lining the margin of the cartilaginous vocal cords. For, after the mucous membrane has been removed, and the air is allowed to pass through the vocal cords thus prepared, only an explosive noise results, but no sonorous vibrations.

The modifications of tone are produced both by alteration in the tension of the vocal cords and by modification in the width of the fissure. Fournié next describes an artificial larynx constructed of caoutchouc in accordance with this theory, with which he means to produce the various alterations of tone which the human larynx is capable of, by a widening of the fissure, as well as by greater tension of the membranous vocal cords. This appears improbable to the Reviewer for the simple reason that such an instrument lacks the space of resonance present in the cavity of the mouth and pharynx. Faber's speaking machine, described by the Reviewer (in "Sprache und Ohr," p. 67) assuredly acted more perfectly, more than seventy years ago, than Fournié's instrument, which hardly offers any thing new.

The author even emphasizes that the space of resonance of the cavity of the mouth and pharynx gives to the vocal sounds their peculiar character, and therein distinguishes six regions which may form special sounds by their resonance : 1. The region of cavity of the mouth. 2. The region of the nasal cavity. 3. The glosso-palatal region. 4. The middle (? Rev.) glosso-palatal region. 5. The anterior glosso-palatal region. 6. The lateral glosso-palatal region, namely for A, È ouvert, E simple and É, I and I russe. In these we have to deal with simple resonance only, while O, OU, EÛ, EU, ÉU, U require a double resonance, *i. e.*, the co-operation of two resonance spaces, and AN, ON, EIN, EUN that of three.

A proof for these views is nowhere furnished, nor is account taken of the variation in the configuration of the opening of the mouth, which is of such importance in the pronunciation of the various vowels. The Reviewer likewise cannot concur in the classification of the consonants advocated by the author, inasmuch as it is utterly useless in an acoustic sense. The consonants are divided into: 1. *Soufflantes*, (H, Ch as in chat, S, F); 2. *Murmurantes orales* (g in gueusti, j in jardin, Z, th anglais, L); 3. *Murmurantes nasales* (ng in onguent, gn in seigneur, N. and M); 4. *Vibrantes* (R); 5. *Demi-explosives*, (g in gamin, dj in adjuvant, D, DZ, B); 6. *Explosives*, (V, tch, T, TS, and P).

III.—PATHOLOGY AND TREATMENT OF THE ORGAN OF HEARING.

By A. HARTMANN, of Berlin.

(Conclusion of the first half of 1881.)

NERVOUS APPARATUS.

50. J. Gottstein, Breslau. Weitere Beiträge zur neuropathischen Form des Ménière'schen Symptomencomplexes. (Further contributions to the neuropathic form of the Ménière group of symptoms.) *Arch. f. Ohrenheilk.*, Bd. xvii, p. 174.

51. McBride, Edinburgh. The etiology of vertigo. *Med. Times and Gazette*, Jan. 22 and 29, 1881.

52. Lucae. Ueber optischen Schwindel bei Druckerhöhung im Ohre. (On optic vertigo in increased aural tension.) Verhandl. der physiol. Gesellsch. in Berlin, Feb. 11, 1881.

53. J. A. Spalding, Portland. Diplacusis binauralis: a self-observation. These Archives, vol. ix, p. 330.

54. H. Schwartze. Stichverletzung des Ohres mit Ausfluss von Liquor cerebrospinalis. Schwere Hirnreizungssymptome durch Hirnhyperämie. Heilung. (Stab-wound of the ear, with escape of cerebro-spinal fluid. Grave symptoms of cerebral irritation due to hyperæmia of the brain. Recovery.). *Arch. f. Ohrenheilk.* Bd. xvii, p. 117.

55. R. Körner, k. s. Stabsarzt. Schussverletzung des Ohres mit Ausfluss von liquor cerebro-spinalis. (Gunshot wound of the ear, with escape of cerebro-spinal fluid.) *Ibid.*, p. 195.

56. James Love. Fracture of base of skull. Recovery. *Glasgow Med. Journ.*, vol. xv, No. 3.

50. GOTTSTEIN adds some new observations to those formerly reported (these ARCHIVES, vol. ix) respecting the neuropathic form of the Ménière group of symptoms. A great number of cases appearing at first sight as Voltolini's otitis labyrinthica prove on closer inspection to be secondary forms, especially of cerebro-spinal meningitis. The meningitic symptoms invariably precede those of the ear, thus invalidating Voltolini's argumentation. The facial nerve need not be implicated. Gottstein twice observed anæsthesia in the auriculo-temporal nerve, and one patient could perforate her drum-membrane with a little piece of wood without feeling any pain. In conclusion, Gottstein summarizes his view in stating his belief that the cases described as otitis labyrinthica are secondary to an affection of the trunk of the acoustic nerve, in consequence of meningitis.

51. MCBRIDE's explanations respecting the etiology of vertigo culminate in his assumption of a cerebral centre the excitation of which produces vertigo. This centre can be excited by influences from the eye, ear, sensorial or visceral, as well as central alterations. Impressions reaching one of these centres draw the others into their domain, during excess of nervous excitement. Hyperexcitation of the vertiginous centre excites the various motor centres and probably causes unconsciousness also. According to the centre first affected, we distinguish whether we have to deal with optic, stomachal, or aural vertigo.

52. LUCAE, in defects of the drum-membrane with completely pervious tubes, observed symptoms of vertigo, if the atmospheric pressure in the external ear canal was suddenly increased. In one case, which is reported in detail, with an excess of pressure in the left ear of 0.1 atmosphere, vertigo occurred coupled with the sensation as if objects were turning from left to right; in the right ear, the direction of the apparent gyration was reversed. There was also observed a dimming, an obscuration before the eyes; with greater pressure, scintillations of light, immediately increased frequency of respiration which became deeper and frequently interrupted by sighs. On examining the eyes, the globe of the irritated side was found abducted, and Lucae therefore ascribes the symptom of vertigo to crossed double images.

Lucae considers these phenomena to be difficult of explanation, inasmuch as the variations of pressure propagated from the labyrinth to the brain can be but minimal, unless we should assume that by their abrupt effect they excite the cerebral nerves situated at the base of the brain (acoustic, abducent, optic tract, and Christiani's centre of inspiration). A second explanation, according to Lucae, would be, that the dura mater was irritated through dehiscences in the tegmen tympani. Besides, Lucae thinks, we might take into consideration the irritation exerted on the tympanic plexus by the puffs of air.

54. SCHWARTZE communicates a case of injury, by means of a knitting-needle, of the membrana tympani in the region of the stapes, which was followed by transient syncope, vomiting, no hemorrhage, but escape of cerebro-spinal fluid from the ear. This flow lasted eight days and was so profuse that there was a continuous trickling. The most violent earache, headache, and vertigo at once set in and were followed by symptoms of cerebral irritation (headache, photophobia, cutaneous hyperæsthesia, isolated partial convulsions, restlessness, delirium, insomnia with vivid dreams) lasting four weeks. They were ascribed to a febrile (temperature in the beginning above 39° C.) cerebral hyperæmia said to be induced by the escape of the cerebro-spinal fluid. Schwartze leaves it an open question whether there had been a lesion of the labyrinth from the penetration of the needle into the fenestra ovalis or into some other part of the wall of the labyrinth. The possibility is also admitted that the cerebral fluid might have been evacuated through the tegmen tympani, after its perforation by the needle, with simultaneous rupture of the mucous membrane and the dura mater.

55. In the gunshot wound reported by KÖRNER, the ball had entered the right auricle close behind the opening of the external meatus ; there was no point of exit. After the injury, no loss of consciousness, but violent pain, loss of equilibrium, walking in a circle, deafness. From the wound oozed a watery transparent liquid mixed with blood (cerebro-spinal fluid). Two days after the injury, the discharge amounted still to about 2 *ccm.* in the course of fifteen minutes. This flow continued eight days. Recovery ensued with deafness, without removal of the bullet. At the last examination made, the drum-membrane was found completely absent, excepting a few cicatricial strings at the superior margin ; about one third of the circumference of the bullet could be seen embedded in the posterior wall of the drum cavity ; it could not be moved with the probe.

56. LOVE reports a case of fracture of the base of the skull, with escape of blood from ear and nose for two days, and of cere-

bro-spinal fluid from the former. Recovery. A facial paresis originally present passed off.

NOSE AND NASO-PHARYNX.

57. Julius Althaus, London. A lecture on the physiology and pathology of the olfactory nerve. *Lancet*, May 14 and 21, 1881.

58. Jurasz, Heidelberg. Ein einfaches Nasenspeculum. (A simple nasal speculum.) *Mon. f. O.*, No. 6, 1881.

59. Creswell Baber. Self-retaining nasal speculum. *Brit. Med. Journ.*, Jan. 8, 1881.

60. B. Fränkel. Zur Rhinoscopie. *Berl. klin. Wochenschr.*, No. 3, 1881.

61. Arthur Hartmann. Ueber rhinoscopisches Operiren. (On rhinoscopic operations.) *Ibid.*, No. 23, 1881.

62. J. Habermann, Prague. Beitrag zur Untersuchung des Cavum pharyngo-nasale mit den Zaufal'schen Nasenrachentrichtern. (Contribution to the examination of the naso-pharyngeal cavity with Zaufal's funnels.) *Wien. med. Presse*, No. 23, 24, 25, 1881.

63. Gottstein, Breslau. Ueber die verschiedenen Formen der Rhinitis und deren Behandlung vermittelst der Tamponade. (On the various forms of rhinitis, and their treatment, by means of the tamponade.) *Berl. klin. Wochenschr.*, No. 4, 1881.

64. M. Schäffer, Bremen. Ozäna. *Mon. f. O.*, No. 4, 1881.

65. Alfred Martin, Paris. De l'ozène vraie. Paris: A. Parent, 1881.

66. E. Fränkel, Hamburg. Kritische Bemerkungen zu der Brochure des Docteur etc. Alfred Martin, "De l'ozène vraie." (Critical remarks on Dr. Martin's pamphlet, etc.) *Bresl. ärztl. Zeitschr.*, No. 11, 1881.

67. A. Hartmann, Berlin. On epistaxis, nasal tamponade, and their relations to affections of the organ of hearing. These Archives, vol. x, p. 149.

68. W. R. Speiers, Haltwhistle. Notes of a case, the chief symptom of which consisted in persistent and copious secretion of a watery fluid from the nose. *Lancet*, March 5, 1881.

69. Bezold, Munich. Zur operativen Behandlung der adenoiden Vegetationen des Nasenrachenraumes. (On the operative treatment of the adenoid vegetations of the naso-pharynx.) *Aerztl. Intelligbl.*, No. 14, 1881.

70. J. MICHAEL, Hamburg. Doppelmeissel zur Behandlung adenoider Vegetationen des Nasenrachenraumes. (Double chisel for the treatment of adenoid vegetations of the naso-pharynx.) *Berl. klin. Wochenschr.*, No. 5, 1881.

71. ARTHUR HARTMANN. Ueber die Operation der adenoiden Wucherungen und hypertrophischen Pharynxtonsillen. (On the operation of the adenoid proliferations and hypertrophied tonsils.) *Deutsche med. Wochenschr.*, No. 9, 1881.

72. VICTOR LANGE. Om Naesepolyper. (On nasal polypi.) Copenhagen, 1880.

73. ARTHUR HARTMANN. Ueber die Operation der Nasenrachenpolypen. (On the operation of naso-pharyngeal polypi.) *Deutsche med. Wochenschr.*, No. 6, 1881.

74. TH. HERRING, Warschau. Zur Casuistic der Fremdkörper und Concretionen in der Nasenhöhle. (Clinical cases of foreign bodies and concretions in the nasal cavity.) *Mon. f. O.*, No. 5, 1881.

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57. After an introductory discussion of the importance of the olfactory organ, ALTHAUS gives a synopsis of its pathology. Any thing interfering with the secretion of the mucous membrane—excessive heat or cold, inspiration of dust, and the first stage of coryza—diminishes the sense of smell. Persons with a dry mucous membrane can smell well only in moist air. In like manner, an excess of mucus is unfavorable to smell.

Congenital absence of the sense of smell is rare. At times the olfactory nerve suffers atrophy. In fractures of the skull, anosmia arises from tearing of the nerve as it passes the ethmoid foramina. Excessive irritation may destroy the sense of smell temporarily or permanently. Althaus mentions the case of a Bremen physician who suffered permanent loss of smell after dissection of a gastric carcinoma. Inflammation of the olfactory nerve seems to be of very rare occurrence; one case came under Althaus' observation. Chronic neuritis of the ofactorius with loss of smell may occur in syphilis. Anosmia may also be found in neoplasms at the base of the skull and in affections of the cerebral olfactory centre.

As to treatment, two drugs have antagonistic effects: strychnia increases, morphia diminishes olfactory perception. According to Althaus, strychnia, either locally or internally, wonderfully increases the acuteness of the sense of smell, especially the former. For anosmia, Althaus prescribes strychnia, gr. $\frac{1}{24}$, with powdered sugar, gr. 2, to be snuffed up twice daily; the dose is increased to gr. $\frac{1}{12}$. In hyperosmia of epileptics, Althaus injects subcutaneously morphiæ acet., gr. $\frac{1}{6}$, with atropiæ sulph., gr. $\frac{1}{60}$. He cautions against the employment of the constant current.

In conclusion, the diagnostic value of certain smells in the sick-room is discussed.

58. Jurasz describes a very simple nasal speculum. It consists of two equal dilators constructed of thick wire, resembling in form large hair-pins, the terminal ends of which are bent in opposite directions at an approximately right angle. Each of the dilators must be held in one hand. During operations, Jurasz uses but one dilator. (In the absence of the certainly more convenient bivalve specula, Jurasz' dilators, which in case of necessity, as pointed out in conclusion by the author, can be easily formed from a hair-pin, will certainly deserve consideration.—Rev.)

59. Baber's speculum consists of two hooks of silver-plated wire, joined by an elastic ribbon which is made to encircle the head. The posterior side of the ribbon is provided with a buckle. (Unfortunately it is impossible to press the tip of the nose upward with such an instrument, so that the view is quite imperfect.)

60. Fränkel, in his lecture, discusses the importance of examination of the naso-pharyngeal space, and points out the obstacles in the way of simple posterior rhinoscopy. The examination with the palate hook, after Voltolini, Fränkel considers an essential progress in rhinoscopy. Inasmuch as it appears desirable to have the hand free which is required for the hook, Fränkel fastens it to the patient, one hook being attached by means of a screw to the upper frame of the Whitehead oral speculum. Fränkel did not succeed well with a hook devised by Hartmann for the same purpose.

61. Hartmann describes the application of the hook which may be attached to the patient, and which he exhibited at the meeting of natural philosophers at Baden-Baden. This is followed by the description of an oral speculum which is much simpler than Whitehead's instrument; to it may also be attached the appliance for the fixation of the soft palate in the manner devised by Fränkel. For patients who cannot bear the application of the palate hook, or have an invincible repugnance to it, Hartmann recommends the performance of rhinoscopic operations, or even examinations, under chloroform. Such a rhinoscopic operation is described, which was performed under chloroform, the patient being in the sitting position.

62. HABERMANN, in his essay, enumerates the opinions expressed for and against the application of Zaufal's naso-pharyngeal funnels. He himself has employed them in the examination of about 2,000 patients. The manner of the examination is briefly discussed, and mention made of the fact that Zaufal lately has had convex lenses attached to the funnels for the enlargement of the image. The stronger numbers are required only for therapeutic manipulations. Habermann examined with the funnels even children of from five to seven years; among 674 patients, the examination could be made bilaterally in 510, *i. e.*, 75.7 %, and unilaterally in 112, *i. e.*, 16.6 %. In 47 patients it was impossible to introduce the funnels; 5 objected to their employment. Posterior rhinoscopy with mirror and tongue-depressor succeeded only in 58.3 % of those examined. The pain on introducing the funnels is quite inconsiderable; hemorrhage occurred 32 times in the cases examined. Larger projections and distortions of the nasal septum were noticed in 102 among the 674 patients; unilaterally in 96, bilaterally in 6. In but 37 cases they formed an obstacle to the examination.

63. GOTTSTEIN believes that his method for the treatment of fetid rhinitis has not met with sufficient encouragement, and formulates the following statements: "1. I know of no remedy that, in every form of rhinitis associated with the formation of crusts, is better fitted to loosen the crusts present and to liquefy the secretions generally than the tomponade. 2. In the so-called atrophic rhinitis, the tamponade removes the fetor, while it liquefies the secretions; but the former is not affected thereby if due to necrosis. 3. In the atrophic form the tamponade is only effective when the tampon is in contact with the atrophically diseased mucous membrane." Gottstein is convinced that there is no ozæna without real disease of the nasal mucous membrane or its adjoining cavities, and that various processes, of both dyscratic and non-dyscratic origin, form the basis of the fetor. The atrophic form of ozæna develops from the hypertrophic. In the latter affection, Gottstein saw good results from galvano-caustic treatment where there was hyperplasia of the mucous membrane; the same treatment failed with him if the inflammation sprang from cartilage or bone. One case is communicated in which the occlusion of the nose was caused by perichondritis of the septum. Recovery ensued with large loss of substance in the septum. Syphilis could be excluded. In the tamponade it is essential

that the cotton comes in contact with the diseased mucous membrane. It is good practice to make the tampon long enough to reach the choanæ, 4 to 5 *cm.* long, and at most $\frac{1}{2}$ *cm.* thick. The cotton is wrapped around the previously recommended small screw with double thread, and introduced with it.

64. SCHÄFFER considers the fact as established that ozæna occurs only on dyscratic soil in scrofulous, phthisical, syphilitic individuals, and believes that on this soil is developed the ferment which decomposes the secretion and gives it the pestilential odor. With Gottstein, Fränkel, and others, Schäffer distinguishes a hypertrophic and an atrophic stage of ozæna. In the hypertrophic stage there is usually a very profuse, thickly purulent, creamy secretion. In the atrophic stage, thin, delicate crusts form. Of his cases, 47 belonged to the first, 52 to the second stage. Scrofulous ozæna, according to Schäffer, seems to develop from the ninth to the twelfth year, and he believes that the duration of the hypertrophic stage extends over six to eight years. Schäffer's treatment consists of nasal irrigations with a lukewarm solution of potassium chlorate, by means of the posterior nares syringe. Besides, cotton tampons are worn for several hours daily, and insufflations made with boracic acid, alum, tannin, sodium benzoate with talcum (1:5), silver nitrate with talcum (0.1–1:5), and with pure iodoform in syphilis. Attention must also be directed to general treatment and hygienic conditions.

65, 66. Basing on observations made at Calmette's clinique, MARTIN furnishes a very thorough, and, in the Reviewer's opinion, very characteristic description of ozæna, which, in the main, follows the view advocated by Zaufal. FRÄNKEL, in a reply, attempts to prove most of the deductions made by Martin to be incorrect.

Martin distinguishes, as is now almost generally done, two forms of ozæna—that with osseous destruction and that without affection of the bone, the non-symptomatic, true ozæna. Ozæna, as a rule, sets in at puberty. While Martin is of the opinion that patients suffering from ozæna do not show a scrofulous aspect, that their affection rather marks them as scrofulous individuals, Fränkel's patients were, at least in the great majority, ill-nourished, poorly developed persons who would have to be designated as scrofulous.

According to Martin, who in this respect adopts Zaufal's views, the primary affection in the development of ozæna is the abnormal width of the nasal cavities, in consequence of which the disease of the mucous membrane occurs, produced by the irritation of the inspissated secretion. Fränkel, on the other hand, ranges himself with Gottstein, who assumes that ozæna occurs in consequence of a hypertrophic nasal catarrh which later changes into atrophy. Martin emphasizes that we inquire in vain of patients for the first stage of the affection, while Fränkel refers to Bresgen's statement that we can in all cases of ozæna demonstrate that at first an ordinary nasal catarrh had existed, unaccompanied by fetor. (The Reviewer, like Martin, almost invariably received from his ozæna patients the assurance that they had never suffered from chronic catarrh. The first symptom to occur is the formation of crusts and the offensive odor.) Martin's treatment consists of syringing with the posterior nares syringe after Michel, and of the employment of the tamponade after Gottstein.

68. Speiers describes a case of continuous trickling of watery fluid from the nose which had existed for nine months. The discharge was so considerable as to fill an egg-cup, holding nearly an ounce, in the course of fifteen minutes. The mucous membrane showed nothing morbid. Recovery ensued in the course of a week, after the patient had kept his nostrils continually filled with goose grease.

69. For the removal of adenoid proliferations Bezold employs Wilde's écraseur which is introduced through the nose. If the nose is impervious to the instrument Bezold uses the spoon, the ring of which has been modified by Justi so as to form a prolongation of the finger-nail. The ring intended for the third phalanx of the index finger should fit the finger exactly.

70. Michael recommends for the removal of adenoid vegetations of the naso-pharynx a forceps called by him a hollow chisel, which differs from the ordinary form by a greater curvature of the part inserted into the naso-pharyngeal space.

71. Hartmann employs the écraseur for the removal of adenoid vegetations and hypertrophied tonsils. The terminal piece used for this purpose consists of a tube the end of which is split in the centre and formed into a groove. The latter piece is bent to form an eyelet, the end being again soldered to the tube. The eyelet, therefore, consists of a groove open toward the centre which incloses the steel wire. The curvature of the terminal piece is such that if the eyelet is pressed

against the roof of the naso-pharyngeal space the proliferations are included in it and can be snared off. The operation is the mildest for the patient, the removal is effected in the most certain manner, and the apparatus is very simple.

72. In his monograph on nasal polypi (pp. 56), LANGE furnishes a very detailed description of them, and particularly of their treatment. He uses a wire snare formed on Wilde's principles.

73. HARTMANN has repeatedly succeeded in removing pediculated naso-pharyngeal polypi by tearing them off through the mouth. Two cases are reported in which the removal of polypi was accomplished in this manner without causing any particular pain. Inasmuch as the application of the wire snare from the nose is not always easy, frequently fails, and is conjoined with many inconveniencies for the patient, Hartmann believes that the tearing off of polypi has several advantages, *i. e.*, more complete, more rapid, and more agreeable removal of the growths. There are no incidental injuries to be feared.

74 HERRING reports two cases of foreign bodies in the nose. In the one case, a button, 12 *mm.* broad, was extracted with dressing-forceps. In the second case, the patient had put a button into the nose nine years before, and a calculus had formed around it. With the dressing-forceps a large number of small pieces could be broken off and removed. The rest was too large to be extracted, and was therefore pushed into the naso-pharyngeal space with a metallic catheter, thence it passed into the pharynx and was swallowed by the patient. The stone had caused complete disappearance of the lower, and caries of the middle turbinated bone, also erosion of the septum. The entire surface of the mucous membrane was covered with granulations.

PERSONAL INTELLIGENCE.

Dr. Hermann Steinbrügge has settled at Heidelberg as lecturer of otology at the university.

Mr. A. E. Cumberbatch has been formally appointed Aural Surgeon to St. Bartholomew's Hospital, where for several years he has had charge of the patients in the ear department.

OBITUARY.

Dr. R. Schalle,

At the conclusion of the present number, we receive the mournful intelligence of the death of our esteemed collaborator, Dr. R. Schalle, of Hamburg.

Repeatedly interrupted in his untiring activity by disease, Dr. Schalle died of gastric hemorrhage, after an illness of but two days, on December 3, 1881, at Warmbrunn.

Amiable in his intercourse, irreproachable in character, imbued with genuine love for his professional brethren, strongly objective in all his scientific publications, a skilled and conscientious physician, the deceased enjoyed the esteem of his colleagues as well as the love of his patients.

In him scientific otology loses an able and thorough contributor.

Honor be to his memory, peace to his ashes.

VOL. XI. No. 2.

ARCHIVES OF OTOLOGY.

RAILROAD ACCIDENTS IN CONNECTION WITH BAD HEARING OF ENGINE-DRIVERS.

By Prof. S. MOOS, M.D., of Heidelberg.

Translated by William C. Ayres, M.D., New York.

SINCE the discussion of this subject, called up by myself at the Otological Congress in Milan, my opinions of the effect of the deteriorated hearing of engine-drivers have been confirmed by many authors: among whom are Drs. Bürkner of Göttingen, Schwabach and Pollnow of Berlin. Pollnow has arrived at conclusions as to the dangers to the travelling public from this source, which, however, seem to render my observations of but little importance. Dr. Jacoby has come almost to a negative result, since in ten and a half years he has examined the ears of eighty engine-drivers and treated twenty of them. Of these, five had one-sided affections of the labyrinth, and fifteen had acute or chronic inflammations of the middle ear. Jacoby draws the conclusion, that the deteriorations of hearing which I have pointed out are not the rule, and states the danger to travellers is not so great from this source as from color-blindness. Dr. Hartmann (*Deutsche med. Wochenschr.*, No. 3, 1882) holds the same opinions as myself. He states that it is not alone necessary that the ordinary signals should be distinguished, but that there are other circumstances under which an engine-driver is placed which render hearing more difficult, such as running in storms, over a frozen track, and through tunnels, etc. According to his experience, there are again other conditions which cause an engine-driver, who already hears badly, to hear much worse after having made a long journey (but recovers his hearing after leaving his engine).

I have vindicated my opinion when Schwabach and Pollnow asserted that those who can understand an ordinary conversation are able to fulfil the requisites of an engine-driver or fireman.

I have always had the subject in mind, believing it to be the greatest benefit a physician can do to expose certain dangers to the public, and combat them prophylactically. I could never familiarize myself with the idea that a certain defect of hearing might be compatible with a smooth working of the complicated machinery of railroads, and not involve great danger to the travelling public. On the contrary, there should be a very high standard demanded in order to reduce the numerous sources of accident.

On this question an English reviewer records the same opinion in the *Lancet*.[1]

He requires from railroad employés the highest acuity of all the senses, not only of the sense of hearing, and supposes that it is possible that the recent accident in Canonbury might have resulted from the engine-driver not having been able to hear the signal given by the signal-man.[2]

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[1] The *Lancet*, No. xxvi, vol. ii, 1881, Dec. 24th. Engine-driver deafness. After giving the opinion of Pollnow, Schwabach, and myself, he continues: "Some hesitation may be reasonably felt in accepting this conclusion (viz., that as long as a conversation in ordinary voice can be heard their defect involves no danger to the public). Surely the engine-driver is often dependent upon his ear for other information than that derived from a fog signal or a starting whistle. Often an unwonted sound from some part of the engine is the first intimation that something has gone wrong with the machinery, the early recognition of which might be of importance. The signal by which passengers can communicate with the engine-driver appeals to the ear, and a slight signal amidst the noise of the train might be unnoticed by men with slight defect of hearing, although capable of being perceived by the normal condition of this faculty. So, again, in such an instance as the Canonbury accident, in which the signal-man states that he gave a word of caution to the passing driver, which the latter asserts he did not hear. Whether such warning was or was not heard, or its exact purpose recognized, might readily depend, in same instances, on the acuity of the sense of hearing in the driver. Railway systems are so complex and delicate in their organization, that those who work them need to have every sense in perfect operation. Pains have been taken to obviate the danger arising from color-blindness, and it is certainly desirable that investigations should be made to ascertain how far the effects on the hearing of engine-drivers produced in Germany are produced also in this country."

[2] According to a verbal statement made to me by one of the students of my clinic, Dr. Burnham, from Canada, who was in London at the time, three trains collided in a tunnel on this occasion.

Unfortunately he does not state whether this particular engine-driver was hard of hearing or not. Every one will agree that, even if the driver had normal hearing, the occurrence of the accident demonstrates the importance of perfect hearing in engine-drivers.

The remarks of our English reviewer are certainly correct and convincing.

A similar accident happened in France, in October, 1880, fortunately without loss of life, but with a very great impediment to travel. I quote the facts as they were related in the French newspapers: "Le Journal de l' Aisne rapporte un fait peutêtre sans précédent dans les annales des chemins de fer:

"'Mercredi soir le train de huit heures vingt et une minutes, qui ramène les voyageurs partis de Paris à cinq heures trente, entrait en gare de Provins attendu impatiemment, comme tous les jours, par une centaine de personnes.

"'Le chef de gare, les employés, tout le monde ouvrait des yeux écarquillés ; seuls, le mécanicien et le chauffeur continuaient à s' approcher en serrant les freins, avec la tranquillité que donne la quiétude d' un devoir accompli. Ce n' est que quand la machine eut stoppé qu' ils commencèrent à se rendre compte de l' ébahissement de la foule. La locomotive, son tender, et le wagon de bagage étaient venus seuls de Longueville; on avait tout simplement oublié d' accrocher le train.'"

The accident happened at night, and, since it was dark, unless we consider that both driver and fireman slept the whole length of the journey, we must conclude that they were so far defective in hearing that they did not know that the peculiar noise made by a train behind them had ceased.

How necessary normal hearing is in certain railway accidents is shown by the following case which I only recently had to examine:

Andreas Schneider had been an engine-driver for seven years, was stationed in Karlsruhe and had never been on a road where there were tunnels. He consulted me on January 19, 1882, and related the following: On December 23, 1881, while on the journey from Karlsruhe to Rastadt, a cock was blown out by the steam at 5.30 A. M.; on account of this there was a terrible hissing at the locomotive, in order to stop which the fire had to be taken out of the furnace. "After I had done this we started toward Offenburg. During the first half hour I had severe pain deep in both ears, which then passed off and did not return." He said he had noises in both his ears, like the chirping of a cricket, but more on his right side than on his left, which continued up to the time of consultation. From Rastadt to Offenburg he did not hear the pumping noise which the engine makes in forcing the water from the tank into the boiler, so that the engine-driver had to attend to his duty for him. He could not do it himself until daylight came. Even then he could not hear the noise of the pump, but by means of his vision he could see that no water was lost while the pumping was going on. Since this time, has not been on the engine.

Examination showed: bone-conduction preserved only for C″ turning-fork on the forehead, being wanting for a watch which should be heard at 10 metres. He heard the watch at 0.15 with his left ear, and 0.10 with his right. Whisper =1 metre on both sides. Both drum-membranes showed total opacity of their mucous coats. Nothing else abnormal. Only sixteen days had elapsed between the time of the accident and my examination, so that we are forced to conclude that the ear was not a normal one for a long time before the accident. The accident had probably caused a bilateral labyrinth affection, either in the form of an exudation or a hemorrhage, which caused the sudden occurrence of the subjective symptoms and the deafness for higher and lower tones, while the perception for the middle ones remained. This fact makes the diagnosis of hemorrhage probable, and also that the middle convolution of the cochlea remained free.

Applications of Politzer had no effect. Injections of carbonate of soda into the drum-cavity from January 14th to February 2d, caused a diminution of the subjective symptoms, while the tuning-fork symptoms remained the same, but his hearing for the voice was much improved. He heard a loud voice at 1½ metres. He was declared to be permanently unfit for duty.

That extraordinary circumstances, such as high wind and storms, can cause the signals to be misunderstood in persons who already hear badly (Hartmann), I can show by a case which I have examined very recently.

Emil Lapp, æt. 32, a reserve engine-driver came to me, "because he did not wish to be guilty of any neglect of duty in the future." He had been employed for two years, but had never been on duty on a mountain road. He was uncertain in his manœuvres when the wind blew, or in a storm, and under such circumstances he had lost confidence in himself. "At night I can orient myself by the colored signals, but in the daytime I have to rely on the fireman, who hears better." I must say that he understood a conversation at 2–3 metres perfectly at his first consultation, and in this respect he improved under treatment, so that I was finally able to declare him capable of doing duty on his engine.

Sometimes the optical signals can not be made out by the sharpest eyes, as in a fog, and in such cases the ear must be appealed to for signals, as a matter of safety.

The following furnishes an illustration of this, which I take from one of our newspapers; a telegram from London, January 20, 1882: "The unusually thick fog of yesterday caused many accidents, the worst of which was a collision at Horney Station, North London. The fog cleared up near evening, but reappeared so suddenly that the fog signals could not be prepared quick enough. A train from King's Cross for Enfield was standing at Horney Station; a following train from Barnet, whose engine-driver could not have seen the signal to stop, ran, with half speed, into the front train, and wrecked the last car, which was crowded with laborers returning from work. Two people were killed; eleven severely, and as many more slightly, wounded." From this short list of accidents we must certainly come to the conclusion that an engine-driver should possess all his senses in a perfect order. For the safety of the travelling public, and for the prevention of accidents on railroads, not only a certain minimum of hearing is to be required, but both sight and hearing should be perfect since sometimes reliance must be placed in one, sometimes in the other, and often in both combined. By such requirements only can danger and accident be reduced to a minimum ; in this connection we may say to the directors of railroads: "Videant consules ne quid detrimenti res publica capiat." (The consuls have to see that the commonwealth suffers no detriment.)

ON THE FORMATION OF A NEO-MEMBRANE IN THE DRUM-CAVITY, RESULTING FROM HEMORRHAGIC PACHYMENINGITIS.

By S. MOOS and H. STEINBRÜGGE, of Heidelberg.

Translated by William C. Ayres, M.D., New York.

THROUGH the kindness of Prof. J. Arnold we have had an opportunity of examining the two temporal bones of a man who died in the clinic at Heidelberg, of homorrhagic pachymeningitis.

For the symptoms during life we are indebted to Prof. Fürstner as follows:

The patient did not exhibit any loss of hearing, but complained of noises in his ears, and similar sensations to those in his head. He was admitted on account of well-developed hypochondria, with periodical seizures of great anxiety. Attention was called to an organic brain lesion by a severe attack of apoplexy, the consequences of which, however, soon disappeared. After some months he had another attack, exhibiting stupor, frequent vomiting, choked disc on both sides, and rapid emaciation. A tumor or hemorrhagic pachymeningitis was diagnosticated. It must also be remarked that he had an extensive hemorrhage into the optic-nerve sheaths, the incarceration of the optic nerves producing choked discs.

Post-mortem Notes.

Mathias Schwieg, laborer, æt. 56, from Neckarelz. Died May 26, 1881, at 1 A.M. *Post-mortem* May 26th, 10 A.M.

Great rigidity; skin white; numerous death spots. Slightly developed painniculus adip. Muscular system well developed. Strong skeleton. The dural sac of the spinal column distended, containing much clear, serous fluid. Pia mater clear and transparent on its anterior and posterior surfaces, somewhat injected on its posterior surface. Substance of the spinal cord of normal consistency and moisture. Posterior portion somewhat congested. White and gray substances normal.

Skull thick, compact, and well supplied with blood; dura mater adherent only in isolated places.

Longitudinal sinus empty. On cutting through the dura a sac was found which could be detached from the dura toward the left side. It fluctuated, and seemed to be filled with a dark bloody fluid mass. It was evidently the abnormal arachnoid, which showed several layers that were rich in blood-vessels, and contained hemorrhages between them. The sac extended from the point of the frontal lobe back to the occipital lobe. The surface of the brain seemed flattened throughout the extent of the sac. A similar sac was found on the right side, but much more distended. The surface of the brain was more flattened on this side.

The pia of both sides of the cerebrum was somewhat thickened, cloudy, and was detached with difficulty from the brain. The brain substance contained but little blood where it was flattened, but was not otherwise changed. Both lateral ventricles greatly distended, and filled with a red fluid. In the anterior and posterior parts of the left optic thalam., and also in the two corp. quad., were numerous small hemorrhages. The brain substance very soft, and in places spontaneously running together. The other conditions, which are not important to us, we will omit and pass on to the

Anatomical Diagnosis.

Pachymeningitis hemorrhagica int. Hæmatoma duræ matris. Compression of the brain. Hydrocephalus int. Old cicatrices in spleen. Œdema and hypostasis of lungs.

Results of Examination of Both Temporal Bones.

After having separated both pyramids from the temporal bones they were decalcified, and examined according to the method previously recorded. In both were found bone nuclei (already described), which greatly disturbed the decalcification and the subsequent examination. There was one in the right side of the roof of the vestibule 8 *mm.* long and 2 *mm.* broad. In the left there was one on the posterior wall of the vestibule which surrounded the union of the sagittal and frontal semicircular canals.

Condition of the Blood-Vessels.

In both temporal bones the adventitia of the branches of the int. audit. artery had a glassy appearance (it did not color with carmine), and showed ring-like swellings. On the left side there was a concretion of phosphate of lime, which was intimately attached to the wall of the vessel.

The blood-vessels (both in the labyrinth and the whole bone) were filled with cubical-shaped blood corpuscles showing long-standing stagnation. *We found fresh extravasations of blood only between the nerves at the base of the left modiolus.*

Pigment.

Small brown, round pigment granules were on the outer wall of the utricle, the sagittal and horizontal ampullae, besides black pigment particles and a larger, kidney-shaped yellow-brown pigment lump at the sagittal ampulla. Red-brown pigment corpuscles of varying size and shape were at different places in the connective-tissue layer of the walls of the ampullæ, in the sheath of the facial nerve, and in the periosteum of the vestibule of the left ear. In no place were there cells containing blood corpuscles, or changes of the nerves, and the membranous parts of the labyrinth showed no other alterations than those mentioned above.

Middle Ear.

The pneumatic spaces in the right pyramid were remarkably large, and those of the left sclerosed (also the squamous portion of this bone was hyperostotic). At the base of the left temporal bone, and also on the roof of the left tympanic cavity, there were dehiscences. Both the drum-membranes showed peculiar conditions. There was a neomembrane covering the whole mucous tract. It extended from the mastoid antrum to the ostium tympanicum, and covered the floor of the drum-cavity, the labyrinth wall, the ossicles, the tensor tympani, and the neurolemma of the chorda. It was removed from them only with difficulty with the forceps. This new membrane was red (like brick) and showed well-marked circumscribed hemorrhages to the naked eye, as, for instance, on the promontory and ostium tympanicum, and the floor of the drum-cavity. The mucous membrane of the two drum-membranes alone showed no traces of this new membrane.

The external surface of the membrane of the round window was infiltrated with pigment corpuscles and nuclei. The entrance to the left round window was completely filled with a yellowish-brown mass, which was shown under the microscope to be composed of blood corpuscles and round yellow globules. These globules contained fine needle-shaped crystals (margarine), and, consequently, were probably formations of fat.

The Structure of the Neo-Membranes.

The ground structure of these membranes was made up of light, finely fibrous, wavy connective tissue, with a few oval or spindle-shaped nuclei. This tissue surrounded large and small meshes of blood-vessels. The vessels themselves were, for the most part, small, but sometimes of broad calibre, and of uniform size with rare club-like enlargements. The small vessels, which were filled by a single row of blood corpuscles, had the anatomical structure of capillaries; the larger ones, whose walls showed a continuous row of nuclei, were the so-called transition vessels. There were no traces of new-formed arterioles. They were all filled with blood corpuscles, and in some of them the white blood corpuscles predominated. Along the course of the vessels, and in the interspaces between them, we found numerous small extravasations of blood. These were both of old and recent origin, and in some of them, especially the old ones, there were processes of pigment-metamorphosis going on. The pigment was, for the most part, in irregular black lumps.

The Genesis of the Neo-Membranes.

According to Kremiansky, in hemorrhagic pachymeningitis the morbid process follows the course of the meningeal artery, and since the tympanic cavity derives at least a part of its nourishment from this artery, we can consider the membranes as a result of the disease, which goes by preference along certain blood-channels. We can not reject this view, if we bear in mind that the transmission of a disease of the dura mater is rendered more easy by extensions of the dura into the middle ear in several places, of which the one which passes through the fissura petro-squamosa is the most important, and in children contains blood-vessels. Taking all these conditions into consideration, we are rather inclined to oppose the opinions of those who look upon the blood extravasation as the primary cause of the pathological formations in hemorrhagic pachymeningitis (Huguénin, Ramaer, Sperling).

Diagnostic Value of the Neo-Membrane in the Tympanic Cavity.

We have seen above that the diagnosis of the process in the brain was uncertain, as it was either pachymeningitis hemorrhagica or an intracranial tumor. As the diagnosis of the tympanic disease just described can be made with the otoscope on account of the peculiar mixed color of the drumhead, it may be of great service in settling the diagnosis of hemorrhagic pachymeningitis.

A CASE OF COMPLETE UNILATERAL DEAFNESS AFTER MUMPS, WITH CRITICAL REMARKS.

By G. BRUNNER, of Zurich.

Translated by William C. Ayres, M.D., New York.

THE recent publications of Dr. Buck,[1] Profs. Roosa,[2] and Moos[3], and others, have induced me to communicate the following similar observation.

Our experience on this subject is very small, and we have not been able to describe the exact clinical picture, even apart from the obscurity in which the pathologico-anatomical conditions seem to be involved.[4]

Even in the extensive German text-books we can find no mention of such a condition, with the exception of a notice by Moos and Urbantschitsch, where, in a labyrinth hemorrhage, they refer to a *post mortem* specimen after mumps, by Toynbee. In Toynbee's book on ear diseases, we find the following:[5]

"The peculiar poison which is often known under the name of mumps, is frequently the cause of complete deafness, which is generally manifested only on one side. In such cases the nervous apparatus is often affected, since the *deafness occurs suddenly, and is generally of long dura-*

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[1] These ARCHIVES, vol. x, p. 274. [2] Same. [3] Same, vol. xi, p. 13.

[4] If Roosa has really seen so many cases of such deafness after mumps as he implied in the discussion of Buck's cases, I am very sorry that he has not furnished a more minute description of them. I do not know of any case except the one I record, and even this is not a conclusive one, since the patient had had syphilis 13 years before.

[5] The American literature I have not at my disposal.

tion; as a rule, there are no symptoms of disease in the external canal, the drum-membrane, or drum-cavity."

My own observation (of the year 1871) is as follows:

A healthy country girl of 30 years caught mumps in a village, causing a considerable tumefaction of both parotid glands. Soon after she had vertigo, with noises in her right ear like running water. The vertigo increased, and at evening she said she did not hear with her right ear. She remained in bed 8 days, during which time the swellings went down, but the noises and the vertigo remained. When she left her bed she reeled like a drunken person, so that she was ashamed to go on the street. She gradually lost her vertigo, but the noises and the deafness of her right ear remained. On examination the left ear was found normal. In the right ear the drum-membrane was normal, as also the Eustachian tube. The large tuning-fork C′ was not heard before the right ear, and from every point of the head only heard with the left ear.

Examination with the constant current unexpectedly showed on the right side the normal formula with humming of flies at xxiv, 60-100. A D had no influence on the pathological noises.

Internal administration of iodide of potassium had, as was expected, no effect.

A comparison of the five foregoing cases gives us the following symptoms and course of the disease:

1. The nervous deafness after mumps can be one-sided or double-sided, the former being more frequent (3 in the five cases).

2. It is complete, and, according to past experience, is incurable.

3. It develops rapidly in all cases (that is, in a few days), with vertigo and subjective noises, the latter symptoms lasting a long time.

4. There is little or no fever, as it was not noted in any of the above cases.

5. Pain is never or very seldom present; it is only recorded in one of Buck's cases.

6. Consciousness is not lost, nor is there any other symptom present except the excessive vertigo.

7. It happens in children and adults; in the majority of the reported cases it was in the latter.

As is evident the disease has many similarities to Voltolini's and Ménière's disease, but is more like the former than the latter. The vertigo, staggering gait, and subjective noises are common to all three. It differs from Voltolini's disease in the absence of fever, the slight disturbance to the general condition of the patient, and the absence of psychical excitation (coma, etc.), and also in that the deafness after mumps is generally one-sided, while V.'s disease is generally bilateral; the latter seems also to occur only in children. The difference is therefore more quantitative than qualitative, which may be accounted for by the ages at which they occur. It is therefore necessary in morb. Voltolini to exclude epidemic parotitis.[1]

Toynbee[2] has already located the disease in the labyrinth, which is most probably correct. How it gets there we do not know. Roosa's opinion that it goes from the canal into the tympanic cavity, and from there into the labyrinth, is combated by the fact that neither the canal nor the tympanum are affected.

Combeau[3] considers parotitis a general affection with many localized manifestations, and argues against the metastatic theory, saying that he has made observations which show that the conjunctiva, the mucous membranes of the throat, urinary passages, and vulva become inflamed in the course of mumps. He has also often observed that there is sometimes a complication of the testes in mumps. If we consider, as seems probable, that in our case there is an analogy between it and the parotitis, like that between mumps and disease of the testes, we would reduce it to an inflammatory excitation of the labyrinth, which leads to rapid and copious exudation without inclination to suppuration. This would agree with all the symptoms, since the short course and the absence of disturbance to the general condition forbid any idea of suppuration. It does not appear strange that a rapid exudation, in spite of its innocent character and tendency to absorption, should have a fatal effect on the delicate tissues of the labyrinth.

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[1] In the case of children the question in both diseases is as to an *infectious labyrinthitis with rapid serous exudation.* This is a suggestion which I purposely underscore. If we think of a labyrinthine hemorrhage in Ménière's disease, we could explain all three conditions by considering that there was a rapidly increasing labyrinth pressure.

[2] He speaks of a complete disorganization of the nervous apparatus in the labyrinth, and of a dark-colored fluid in the vestibule and cochlea. I regret that his descriptive catalogue is not at my disposal.

[3] Vogel in *Ziemssen's Handbk.*, vol. vii, 1, p. 103.

It appears interesting to me to follow the comparison of the testes complication : a certain identity of both complications can not be mistaken. Orchitis[1] generally begins on the 6th, 7th, or 8th day after the appearance of the mumps. The testes remain swollen for several days after the tumefaction has disappeared from the parotids. The fever, which has generally disappeared by this time, commences anew, and remains for several days, but is not so high. The symptoms are no longer very troublesome, notwithstanding the great swelling of the testicles (sometimes 2 or 3 times the normal size) with which an acute hydrocele or œdema of the subcutaneous cellular tissue is combined. *In the majority of cases only one testicle is swollen*, and generally the right one. The course of the orchitis is analogous to that of the parotitis (and, we may also add, to that of the ear affection), namely, 3 to 6 days on the increase, and subsiding just as rapidly, disappearing in 1 or 2 weeks. Vogel says, " That in this case, as in mumps, the exudation can only be serous, we may conclude from its rapid and certain absorption." Nevertheless, we find in certain epidemics that total atrophy of the testicle occurs.

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[1] Vogel, *A. A. O.*

SUPPLEMENT TO PROF. MOOS AND DR. STEINBRÜGGE'S CASE OF HYPEROSTOSIS AND EXOSTOSIS, ANKYLOSIS OF THE HEAD OF THE HAMMER, BONY CLOSURE OF THE ROUND WINDOW, COLLOID DEGENERATION OF THE ACOUSTIC NERVE IN THE TEMPORAL BONE OF AN 80-YEAR-OLD MANIAC.*

By Prof. ALBERT BURCKHARDT-MARIAN, of Basle.

Translated by William C. Ayres, M.D., New York.

ANATOMO-PATHOLOGICAL examinations of cases in which we have examined the hearing during life, are means which will allow future generations to build up a more exact pathology of the acoustic nerve than we can at present. With this view in mind I think that the following is not without interest.

The sentence, "the hearing acuteness was but little diminished," which occurs in Moos and Steinbrügge's case, may be corroborated by the following fact in the history of the case, kindly furnished by Prof. Wille.

1. Hallucinations occurred for the first time in May, 1875. Before this the patient had never suffered from any subjective ear symptoms.

2. She entered the lunatic asylum on March 4, 1876, and stated that she had never had any ear disease. At this time she heard well.

3. She had hallucinations for a long time, of such a character that she thought some one was sitting close to her on her left side and calling her.

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* These Archives, vol. xi, p. 9.

4. With her left ear she did not hear the watch either on contact with the ear or mastoid process. On the right she heard it at 9 *cm.* but had no bone-conduction (May 18, 1877).

5. Notwithstanding the small amount of hearing in her left ear, her deafness was not conspicuous up to the time of her death.

From the foregoing it appears that at the time of her entrance into the asylum her hearing was normal, and that she had never suffered from any ear affection. Five years before her death she had hallucinations, and referred them to the left ear. Three years before her death she did not hear the watch with her left ear, and with her right only at 9 *cm.* Bone-conduction destroyed.

No great degree of deafness could be determined.

Since Moos and Steinbrügge found ankylosis of the hammer, bony closure of the round window, and colloid degeneration of the acoustic nerve on the left side, they correctly concluded that there was absolute deafness on this side. In the asylum she did not give any symptoms during the latter years of her life, which would be opposed to such a view. It is to be expected that if a person 80 years old, who suffered from complete deafness of one ear, never showed any loss of hearing, the other ear would be found normal. This, however, was not the case, and for this reason I will briefly give the condition of her right ear.

Right Temporal Bone (alcohol preparation).—Dura mater thick, and with difficulty detached; bones everywhere hyperostotic and very compact. (Squama 7 *mm.* thick; just behind the sigmoid sinus 10 *mm.*) In the jugular foramen the jugular vein was separated by a small prolongation of the dura from the n. vagus, glosso-pharyngeus, and access. Willisii. The vestibular aquæduct showed a broad longitudinal fissure with thickened walls. Porus acusticus int. somewhat reduced in lumen. External canal and tympanum normal. The hammer was absolutely immovable with the probe. After removing the annulus tymp., the upper half, and the whole anterior and inferior walls of the tympanic cavity, the head of the hammer was found fastened to the tegmen tympani by a layer of bone. After carefully dividing the joint between the anvil and stirrup, a complete ankylosis of the hammer-anvil joint, and also an absolute immobility of the stirrup in the oval window was found. There was no great change in the plate of the stirrup, except a whitish prominent boundary (chalky deposit in the annular ligament?).

The round window was transformed into a small groove by a bony layer on its walls. After taking this away the membrane was found much thickened. It had an oval form, 2 *mm.* long and 1 *mm.* broad, and was movable. The mucous membrane of the tympanic cavity everywhere thickened. The pyramid sclerosed (ivory). The modiolus was 3 *mm.* thick near its first convolution, and 2 *mm.* at its second. The microscopic examination of the acoustic nerve showed changes which, according to Moos, were the result of the alcohol in which the preparation had been kept. We therefore have *absolute ankylosis of ossicles*[1]; *reduction in size of the round window*, and *thickening of its membrane* in the case of a person of 80 years *who had no remarkable diminution of hearing.*

In young people, when the round window has its membrane normal, the bone-conduction may make some compensation for ankylosis of the ossicles, but that in cases where the bone-conduction is lost there should be good hearing, is very remarkable.

If the round window had been found normal, we could have concluded, that the drum-membrane was fixed and stretched by the ankylosed hammer, and thus was able to make small vibrations and conduct them to the membrane of this window. But the thickening of this membrane would certainly make such a supposition doubtful, although it seems to me still to be the most probable explanation of her good hearing.

There is one fact which we learn from this short communication, viz.: that from changes in the middle ear, even in a most decided form, we must be very careful about connecting such a condition with an *intra-vitam* deafness or deaf-mutism.

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[1] Complete immobility of the foot-plate of the stirrup in the oval window on the left side, but mobility on the right; bony occlusion of the round window on the left, but on the right . . . continue in text.—K.

ON ARTIFICIAL DRUM-MEMBRANES, AND ESPECIALLY THE COTTON PELLET.

By F. GRAF, of Frankfort-on-the-Main.

Translated by William C. Ayres, M.D., New York.

AFTER reading Dr. Knapp's paper on the use of the cotton pellet in defects in the drum-membrane (these Archiv. vol. x, 1, p. 60), I have concluded to make the following communications from my own experience on the subject, and I do not doubt that other German surgeons will also testify to the advantageous use of the cotton pellet in quite a number of cases.

Case 1.—Mrs. M., 35 years old, had had otorrhœa in her left ear since childhood, and after pain, etc., had suffered from it for a week also in the right. She consulted me on May 12, 1881. On the left side she heard the watch at 15 *cm.* On the right, *ad conch.* Bone-conduction diminished. Tuning-fork on the forehead louder on the right ear. Whisper=0. Ordinary conversation, left, ½ metre. Loud noises and vertigo. Rotates her head, and passes her hand over her forehead, as if she wanted to wipe something away, evidently striving to obtain some subjective diminution of her vertigo. Examination showed a large perforation on the left side; mucous membrane of the drum-cavity red, thickened, and but slightly moist. Right, also a large perforation (the size of a pea), with the same conditions of the mucous membrane of the drum-cavity, which, however, did not agree with the history of only an 8-day trouble. On further interrogation she said that she had had otorrhœa in this ear two years ago. In the course of the next few days the secretion diminished, and hearing was better, but she still complained of noises and vertigo, especially on using the syringe. On May 28th a cotton pellet was adjusted in the right ear, apparently with but little result (watch 4 *cm.* and 2 *cm.* without it). Nevertheless, I let it remain, and May 30th she said she had heard better with it, and the vertigo had almost disappeared. The pellet was removed on account of a copious discharge, when she still heard the watch at 30-40 *cm.*, but this did not last. In the left ear the pellet produced no improvement. She was then shown how to put it in and take it out herself. On July 1st she heard a loud conversation at ½ metre without, and at 2 metres with, the pellet. I did not see her after that date.

CASE 2.—Catherine R., æt. 18, consulted me on May 4, 1881. Had lost her hearing almost entirely after scarlet fever and typhus, at 10 years of age, and had had otorrhœa on both sides since that time. She had been treated several times, but without benefit. Heard a loud watch on contact with both ears. Bone-conduction good. Tuning-fork on the forehead equal in both ears. Whisper=0. Loud voice only at the ear. Both drum-membranes showed large defects downward and forward; mucous membrane red and rough. The handle and the remains of the drum-membrane attached to the promontory. No effect was ever obtained from Politzer. Had tried Gruber's artificial drum-membrane. The cotton pellet acted better, so that she could hear the watch at 4-5 *cm.*, and the voice at ½ metre, with the left ear, and was satisfied with it. When the cotton pellet became too dry, hearing was again reduced. I advised her to put in a fresh one moistened with glycerine, and to change it every 2-3 weeks. On Jan. 3, 1882, she had learned to adjust it herself, and used it afterward with good effect.

CASE 3.—Wm. A., æt. 16. The left drum-membrane was entirely lost, and the mucous membrane of the drum-cavity appeared as if covered with epidermis. The right looked as if it were cicatricial tissue. The hearing on the left side was much improved by a cotton pellet moistened with glycerine. There was a great improvement on treatment, so that the cotton pellet was no longer wanted.

Gruber's artificial drum-membrane did not give so good results as the cotton pellet, although in the beginning I used the former with preference (this consists of a thin India-rubber or linen disc with a thread attached to remove it). It is more irritating than the pellet, and its proper adjustment requires a greater skill on the part of the patient. Its effect was good in two cases, and doubtful in two. I will here add them.

Case 4.—Mary W., æt. 19. Consulted me June 24, 1880. Hard of hearing for many years. Loud watch = 5 *cm.* right and left. Old inflammation of the middle ear, with perforation, on both sides. Artificial drum-membrane improved hearing, but was not used by the patient.

I regret to say that I did not try the cotton pellet in this and the following cases.

Case 5.—Marie B., æt. 25. Consulted me Aug. 21, 1880. Had heard badly from childhood, after scarlet fever. The right ear showed otorrhœa with perforation. Left, dry perforation. R heard watch at 2 *cm.*, L at 10 *cm.* An artificial drum-membrane caused otorrhœa in the left ear, and had to be left off, but could be borne later. Discharged Nov. 24th, otorrhœa cured, and with relatively good hearing. (Watch 2 metres right, and 30 *cm.* left.)

Case 6.—Heinrich H., æt. 40. Carriage driver. Consulted me Aug. 9, 1880. Perfectly deaf in the left ear for many years, and recently almost so in the right. Watch=0 on left. Right, *ad conch.* Heard tuning-fork on forehead. Heard the voice only when hallooed into his ear. Left drum-membrane entirely gone; mucous membrane pale and tough. Right, the same. Slight dry secretion in both ears. Politzer did not have the least influence. Put an artificial drum-membrane in right ear Aug. 28th, and the patient immediately heard better, which continued for some days. He learned to put it in and take it out himself, went home, and wrote me later that with the drum-membrane he could attend to his business, but without it he could not.

Case 7.—Mrs. N., æt. 62. Consulted me Sept. 6, 1880. Had heard badly for two years, but her condition varied. Watch=0 right and left; heard only on the right temple. Tuning-fork on the forehead and between the teeth heard louder on the right side. Heard loud voice only with difficulty on the right side. Old perforation in both ears. No effect after Politzer. Heard the ordinary voice much better near by with artificial drum-membrane. Discharged Sept. 10th. Did not see her again.

If I am to draw any conclusions from these few cases I would say, that the artificial drum-membrane is useful only in cases of large perforations, with a tough mucous membrane of the drum-cavity, where there is but little or no secretion, and great diminution of hearing. I think I can also testify to Moos' observation, that the artificial drum-membrane sometimes restores bone-conduction, but in one instance this was not the case. I also agree with Bezold that a layer of boracic-acid powder causes increased hearing by acting as an artificial drum-membrane. As a general thing, however, I am inclined to give the cotton pellet the preference. Its therapeutic effect is also in its favor. It does not seem to me to be of great importance whether the pellet is used dry or moistened with glycerine, vaseline, etc. This depends upon the peculiarity of each case.

ON AURAL AND NASO-PHARYNGEAL DISEASES, AND SOME OF THEIR METHODS OF TREATMENT.

A Posthumous Paper by R. SCHALLE, Hamburg.
With a Brief Preface by S. Moos, Heidelberg.

Translated by Isidor Furst, New York.

THE present paper of our collaborator, unfortunately too soon lost to science and to suffering humanity, was found after his death as a *manuscript sketch*, without any heading. It was an ardent wish of the deceased to render accessible and useful to the larger circle of his confrères the contents of the manuscript, being the experience in the treatment of aural and naso-pharyngeal diseases which he had collected in the extensive sphere of his activity at Hamburg. Many of the items had only been jotted down with the lead-pencil. A careful, probably not always successfully executed, revision was therefore required, in order to make the manuscript ready for the printer. The reader should kindly bear this fact in mind. Assuredly, many a part of it would have appeared in different *form*, if the deceased had had the opportunity of making his final corrections previous to putting it to press. Stern fate has decreed otherwise. Nevertheless, none of our esteemed readers, after perusal of this article, will deny to the deceased the testimony of strict objectivity toward himself and others; nor that he has succeeded in improving the frequently very difficult treatment of the affections in question, both by constructing new instruments and by discovering new methods of treatment, and that he was equally *distinguished by conscientiousness as by knowledge.* In this respect, the present paper appears as a *permanent memorial* to the deceased. MOOS.

In the following pages I do not intend to discuss the entire therapeutics of aural and naso-pharyngeal diseases, but to restrict myself to some modes of treatment which have proved effective in my practice within recent years. I am well aware that but little will be new to many, particularly because what is here offered is intended rather for the beginner in our specialty.

As regards the *method of examination*, I still employ, to my entire satisfaction, my illuminating apparatus,[1] which has been materially improved since its first introduction. I use illuminating gas, to the great advantages of which I have already drawn attention in the second description (see note).

Of tongue-depressors, I believe Michel's to be the best: according to my view, it had better be grasped with the entire fist, the back of the examiner's hand being turned toward his face: in this way caution and force may be combined. Another practical depressor is that of Fränkel, especially for children; that of Türck is best adapted to operations under pharyngoscopy, the patient himself holding the instrument with his right hand.

Obstreperous, vigorous tongues may be most easily overcome, not by continued strong pressure, but by applying the depressor lightly and increasing the force slowly but deliberately, withal repeatedly yielding, then again renewing the pressure. Working thus interruptedly, we are less likely to be fatigued, and avoid causing pain or gagging. Still, it is rather tedious to the physician to continue this exertion in rapid succession. I have become fully convinced of that, here in Hamburg, where the tongues, I think, belong among the best-developed organs, being of great breadth, length, thickness, and vigor to match.[1] I therefore felt constrained to construct a depressor for my own use, which should relieve me of the greater part of this labor, and chose for modification the well-known instrument by Ash.[2] In the first place, I transposed the joint to the rear, lengthened the director, and thus secured a wider range of applicability for higher and lower inferior maxillary bones. Secondly, I attached the tongue-plate movably, and in this way made it serve for different ages, sexes, and peculiar formations (long heads). Thirdly, I omitted the opening in the tongue-plate, through which the upward-curving tongue may project and prevent the introduction of the mirror. Fourthly, I had it deeply grooved to give a firmer hold; and, fifthly, for the same purpose I gave the plate a greater downward curve.

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[1] First described in *Arch. f. Ohrenhlkde.*, x, p. 132; later in the Trans. of the 51st meeting of German Naturalists and Physicians, Cassel, 1878, sections xix and xx.

It is applied by fully drawing out the director, pushing the lower plate under the chin, laying the upper part upon the tongue, and depressing it by sliding the joint with the other hand along the director, and adjusting the length of the tongue-plate so as to grasp the tongue as deeply as possible; avoiding, of course, too near an approach to the root of that organ to prevent gagging. Then, while the speculum-hook is lifted, the upper part is moved still further down the director so as to secure the greatest feasible depression of the tongue, which is now firmly held, and the depressor keeps it immovable after having followed but few of its excursions. Thus, the most obstreperous tongue becomes subdued, and we can introduce the mirror without having previously unnecessarily fatigued ourselves. Besides, more room can often be gained by directing the lower end of the director with the left hand.

Respecting uvula-holders, I still adhere to the view previously expressed, that I believe them to be unnecessary, even injurious. The irritation of the pharyngeal muscles provoked by them renders nugatory the use of the additional room forcibly secured. The palate-hook recently devised by Voltolini may be termed a great acquisition, because in difficult cases it generally allows us a sufficient view—a fact I can affirm from personal experience. Nevertheless, I should wish to see it reserved for such cases only, in order to save the patient the disagreeable sensation of traction on the soft palate.

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[1] This excellent physique of the tongue I believe may be ascribed to the good living of the Hamburgians, continued for several hundred years, thus greatly developing the organ subserving the sense of taste.

[2] Voltolini had previously modified it.

In the majority of cases we attain our object at once by dexterous manipulation of the tongue-depressor and the mirror ; in the remainder, the following is the proper plan and almost always effective. Whenever I have a case which is at all difficult, I abstain from immediate examination, and direct the patient to gargle with salt-water daily in the morning and at night, in the manner to be described hereafter, and then to depress the back part of his tongue with a rounded spoon-handle, at the same time observing his soft palate in the mirror ; in this way he endeavors to place at rest the musculature of the pharynx, upon which he can exert, though not a direct, yet at least an indirect, will-power by means of practice and experience.

The gymnastic exercise of the pharyngeal muscles during gargling, and the habituation to the irritation of the foreign body (spoon), persistently continued, attain the desired object within a few days, rarely weeks, even in the most unfavorable cases (nervousness, abuse of tobacco and alcohol). But let the first examinations be executed rapidly and carefully, and let the patient be forbidden to practise, lest he irritate the parts in advance. If the first examination has succeeded, the subsequent ones may be speedily continued. Long and extensive experience has taught me that this simple method is the best. But it may be objected that in many cases there is no time for this practice. In such a case I have forced the procedure and usually secured good results. In the case of a professor from Königsberg, in whom great irritability was combined with malformation of the nose, rhinoscopy could be performed after four days' persistent practice. Where but a single examination could be had, I have tried the well-known auxiliaries for the forward traction of the soft palate, but with poor success; my more recent experience, however, has convinced me that Voltolini's palate-hook *with groove* can be warmly recommended for rapid results in difficult cases. The fenestrated instrument is objectionable, because the soft parts penetrate from underneath and diminish the image, while the plain smooth hook without groove easily disturbs the view by lateral displacement. Nor should it be forgotten that there are patients who cannot bear the application of the hook at all, so that we can do nothing but accustom them to it by protracted exercise. Certain it is, that with increasing experience of the examiner the difficulties vanish in the same ratio. I think it impracticable to employ Whitehead's tongue-depressor for simple examinations (B. Fränkel): the somewhat tedious application of the instrument, the indescribably oppressive sensation it calls up in the patient (one should have it applied to one's self, as I have done, to understand it) soon make its frequent use distasteful to the physician. I should reserve it merely for operations.

Digital examination is but a poor substitute for rhinopharyngoscopy ; still it is of great value in all cases where the latter is impossible, for instance, in too small or indulged children, in patho-anatomical difficulties, and in the rare cases of invincible irritability. I do not think it necessary, as Meyer demands, to examine with the right hand as well as with the left ; I use the right alone, and quietly and fully palpate the entire pharyngeal space. It is advantageous to introduce the finger not in the middle, but behind the opposite side of the arch of the palate. Not alone children, but adults likewise offer difficulties in this mode of examination. Many, especially frightened children, being rather suspicious, will not open the mouth in spite of all coaxing. In order to secure this, the child's head is tightly clasped in the left elbow, *the thumb* of the right hand is applied to the anterior border of the masseter muscle, and the cheek vigorously pressed against the teeth, which causes sufficient pain to cause the child to open the mouth. At once the buccal mucous membrane is pressed between the two rows of teeth with the left index finger, and the examination leisurely continued; whenever the child bites, it first hurts its own cheek and, therefore, soon desists. After the isthmus of the fauces has been passed, biting is no longer to be feared.[1] Still, I have had cases in which I have pressed livid spots on children without their opening the mouth; it has also happened to me that they caught my finger and bit their cheeks till they bled. For very intractable cases Sachs recommended the following excellent and at the same time gentle procedure for opening the mouth: A hen's feather, which has been stripped except at the very point, is pushed back between the teeth and the cheek, and introduced behind the last molar into the oral cavity, penetrating toward the larynx. Violent retching at once ensues, the child opens the mouth, and nothing is required but to prevent its closure. The procedure of pressing the fingers between the teeth so as to keep the mouth open, in digital examination where only the finger is to be introduced, I believe to be more practical than the use of the various oral specula which usually require a directing hand.

Whitehead's instrument is particularly ill-adapted for use as a speculum in digital examination, because the parts in front of the mouth make the introduction of the examining hand still more difficult. In adults, it is appropriate to call attention beforehand to the disagreeableness of the examination, to prevent interference by their hands. In examining a child I always direct somebody to hold its hands, but to place himself sideways out of reach of the feet, which are often used by children with such vigor as to possibly cause serious injury to the assistant. The palpation of the nasopharyngeal space may then be leisurely proceeded with, but it is essential that it be gently done, lest the soft, yielding proliferations of the pharyngeal mucosa remain undetected. I pass over the remainder of the technique of digital examination as sufficiently described elsewhere.[2]

On *anterior rhinoscopy* I have nothing of importance to add to general knowledge; my efforts to invent a better nasal funnel than that of Duplay (Rober[3]) have thus far not been successful.

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[1] Bites of that nature should not be underestimated; on one occasion I had to discontinue my office hours for a week on that account.

[2] B. Fränkel, etc.

[3] The addition of a speculum hook to this nasal funnel, according to Voltolini, I hold to be impractical; it relaxes too soon.

As regards the *treatment* of chronic inflammation of the naso-pharyngeal mucosa, it requires, in the first place, the following highly important general directions, for no result will be attained without careful attention to them.

1. *Avoidance of the inhalation of cold and hot air, dust and smoke, also of the ingestion of very cold or very hot, strongly alcoholic, or highly spiced foods and drinks.* Of these injurious substances the inhalation of dust and of air at unfavorable temperature is hard to prevent. However, it may be most simply effected by adopting a procedure which I constantly employ in affections of the nose, particularly after operations. I let the patients wear purified sheep's wool.[1] A small quantity is taken, formed into a loose pellet from which no fibre should anywhere project which would cause tickling, and pushed into the nostril. The wool pellet soon expands, adheres to the walls, and permits free passage to the air, but intercepts all particles of dust, products of combustion, etc., and warms the current, I believe, by retarding it without rendering respiration difficult. At first the presence of these pellets of wool is disagreeable to the patient, but he soon becomes accustomed to them, and after sneezing or vigorous blowing of the nose, quickly replaces the lost pellets by new ones, for which purpose he always carries a supply of wool. After operations on the nose, removal of polypi or of parts of the inferior turbinated bone, I believe such protection to be imperative. I employ the same kind of plugging for perforations of the drum-membrane after suppuration has ceased; it prevents the injurious effects of varying temperature and of dust, is not heating, and does not impair the hearing as cotton does.

To prohibit *smoking* altogether I do not believe to be correct, because the patients obey only for a short time and then smoke more inveterately than before; I rather aim to restrict them gradually to a minimum of perhaps three cigars a day. Blowing the smoke through the nostrils I believe to be especially injurious, and insist on its discontinuance; cigarettes, too, seem to be very deleterious, the more so as they are generally consumed in large quantities. A Russian lady patient smoked about forty daily.

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[1] Ordinary coarse sheep's wool is used, all locks are teased asunder, then it is carefully washed with lukewarm (not hot) water and soap. The addition of some ammonia to the water deodorizes it and removes the grease. It seems a good plan, although I have not done it hitherto, to immerse the wool for twenty-four hours in ten-per-cent. carbolic acid solution, and then to dry it.

2. *Gargling*, at first with lukewarm salt-water solution, a teaspoonful to the half-litre, I hold to be the *first curative measure.* This gargling should not be done in the ordinary thoughtless manner, which is little more than a rinsing of the soft palate and oral contents, but is to be performed as follows. The patient assumes the horizontal posture,[1] so that the head is at least as low as the trunk; in this position he fills his mouth with lukewarm salt water, then stretches out his tongue as far as he can, and pulls it still further with his handkerchief; thus the gargling fluid drops behind the tongue into the lower pharynx; now the patient makes a guttural singing noise until he feels the soft palate in front of the liquid, then suddenly and forcibly throws his head forward and upward, thus forcing the water into the upper pharynx and nose, and, in some adroit people with wide nostrils, even out of the anterior nares. In this way alone, the mucosa of the naso-pharynx becomes rinsed and cleansed by the fluid. At the same time, however, the muscles underneath the mucous membrane are made to contract and in turn promote the function of the muciparous glands. This latter effect may be most clearly observed while using the rhinoscope for a prolonged time, as, for instance, on those operated upon, where the patient is continually persuaded to forcibly control the palatine muscles; we then see a great number of small delicate pearls exude from the soft palate which, continually increasing, present a peculiar aspect. After the patient has mastered this gargling, less indifferent drugs may be employed, such as potassium chlorate, alum, tannin, etc.

3. *As an excellent remedy I consider insufflations of silver nitrate.* I believe it to be unpractical to employ the same agent in solution, for, according to my view, we cannot thus

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[1] It is not advisable to allow the patient to gargle while standing or sitting, because it is thus very difficult; at least in the beginning it should be done while recumbent, so that the patient should understand what is required; if thereafter he can accomplish it standing or sitting, he may do so.

reach the entire mucous membrane. Whether introduced with the brush, or—a more cleanly method—according to Richter, by means of a charpie probang, behind the isthmus, the constrictor of the pharynx will invariably press upon it and liberate the liquid. The mucous membrane is drawn into folds the upper edges of which become cauterized, while the intervening parts cannot be reached at all. Even if the *caustic brush* is advanced into the upper pharynx, its liquid has before this dropped out: at any rate we cannot speak of a thorough, uniform cauterization of the entire mucous membrane by this method. To inject solutions by various apparatus has the disadvantage that a portion of the fluid drops upon organs not intended to be touched, nor can a sufficiently uniform distribution be obtained, as the stream is always denser around the main jet. The employment of atomizing apparatus is better, although even they are attended by the above-mentioned disadvantage; moreover, it is very difficult, and possible only in some individuals, to get the canula into the pharynx without contraction of the muscles. Irritable subjects experience contraction when the canula is inserted merely through the nose.

These disadvantages are best avoided by the insufflation of finely powdered caustics—a method long employed by Störk and others. The peculiarity of my method of application consists in the employment of very simple powder-blowers by which the cauterization can be easily and certainly accomplished. The various apparatus devised, in which the medicament is propelled through rubber tubes by means of hand-ball or mouth, are ill adapted, because they soon become clogged by the adhering powder; because they spoil the drug by drawing back into the reservoir particles not expelled; and, finally, because their filling is complicated. Schrötter's glass tubes are better, but a large number of them must be kept on hand,[1] as, to avoid the disadvantages noted above, a fresh tube must be used for every insufflation. But even Schrötter's tubes are equally hard to fill.

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[1] For instance, at present I have one hundred and thirty-seven in use. Immediately after use I immerge them completely in water in a tall glass. When a sufficient number has accumulated, they are cleaned by simple immersion in concentrated sulphuric acid, rinsing in water, and drying.

I employ plain glass tubes, such as may be bought of any dealer, of five to six millimetres external diameter, cut them into pieces from fourteen to eighteen centimetres long by nicking the tube transversely with a few strokes of the file and breaking it; such a piece I hold obliquely in the flame of a Bunsen burner, so as to heat it about two and a half or three centimetres from the end, and bend it, by pressing it on the table, at an angle of about forty-five degrees, the bent part measuring about two centimetres. If the bent portion is somewhat rough, I smoothen it by a few strokes of the file, because that part may come in contact with the pharyngeal mucous membrane. Thirty such tubes may easily be made in an hour. To complete them, I take a rubber tube about forty centimetres long, which of course is used for all tubes and is merely slipped over them, and thus have the simplest insufflator.

The lunar-caustic powder is employed in the following proportions: Silver nitrate to calcined magnesia[1] 1:30, 1:15, 1:10, 1:8, 1:6, 1:5, 1:4, 1:3, 1:2, 1:1. The trituration of both agents must be thorough, in order to secure uniformity. It is well to call the druggist's attention to this. When it is to be used, we scoop up with the glass tube from one of the boxes (which should bear the percentage number in large figures) as much as the bent portion will hold, insert the other end into the rubber tube, the opposite extremity of which is taken into the mouth, hold the glass tube in the right hand, depress the tongue of the patient by the depressor with the left, introduce the tube exactly like the pharyngeal mirror, if possible without touching the organs, behind the soft palate, and with an abrupt puff of air discharge the powder into the upper pharyngeal space. If the patient's nostrils are wide, a part of the powder almost at the same moment escapes through the anterior nares. When the patient is then examined with the rhinoscope, which is quite feasible in some individuals after the insufflation, we see the entire pharyngeal space and the choanæ as if dusted with flour. I do not believe that we can secure an equally intimate contact of the diseased mucous membrane with the remedy in any other manner thus far known. But we do not always succeed as easily. In irritable, nervous, intemperate, or old subjects, the muscles contract, by an effort of the imagination, without touching the mucous membrane, even when the tube is inserted into the mouth. In such patients the tongue is depressed, the glass tube introduced into the posterior pharynx, at any second ready to blow, waiting for the descent of the uvula. In most cases this does not take long, and when it sinks down the powder is blown. No time is to be lost, for the next moment the uvula might again apply itself above to the roof of the pharynx. This manner of insufflation requires some dexterity on the part of the physician.

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[1] Calcined magnesia, on account of its low specific gravity, about one-fifth that of sugar, forms a good vehicle; besides, its slight solubility in water causes a diminished deposition on the walls of the glass tubes. (Mosetig recommended for the same purpose powdered meerschaum, silicious magnesia. —Moos.)

But there are isolated rare cases in which the uvula is held up by the pharyngeal muscles with admirable energy, the patient on his part being too nervous to bear any prolonged manœuvres in his pharynx. In these we simply push the glass tube high up into the pharyngeal space, behind one of the pharyngeal palatine arches, and discharge the powder with strong pressure, in which case, of course, the cauterization is less complete. Sometimes the cauterization succeeds well if the patient is caused to enunciate "ong" during the insufflation.[1] Otherwise, I emphasize the statement that patients become habituated to this treatment just as they do to rhinoscopy, and acquire even a certain knack by which the physician's labors are facilitated.

Besides these cauterizations of the upper, we effect those of the middle and lower pharynx, by likewise awaiting the position of rest of the soft palate, in order to secure a sufficient insufflation of the parts situated behind the palatal arches. In cases complicated with nasal catarrh, I add to the former insufflations those through the nares. In the latter, however, we must take care to introduce the glass tube, so that the bent portion intersects the longitudinal axis of the body at right angles, and be directed downward as far as possible in the nasal cavity, perhaps exactly toward the prominence of the inferior turbinated bone. Whenever the tube is turned upward, the powder penetrates into the frontal cavities, which then react for hours by violent headache. It may be mentioned, in passing, that while the charged instrument is within the mouth, we must abstain from breathing through the mouth or from speaking, otherwise the powder may be blown out prematurely, possibly into the patient's face and eyes.

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[1] I need scarcely add that we should always apply the remedy with some degree of caution, and be always ready to withdraw the tube quickly if necessary; also to make sure previous to use that the glass tube is free from cracks at the bend, lest it might break when inserted into the upper pharynx and produce disagreeable effects. As long as the tube is in the upper pharynx the patient usually retches and does not bite; but if it is still in the mouth, we would be out again in an instant, before a child—which alone would be likely to do so—could bite. But caution can do no harm, although nothing of the kind has happened to me in the last two years, despite numerous applications.

It is self-evident that the *inflammation* of the naso-pharyngeal mucous membrane often extends to the *neighboring cavities in the frontal and sphenoid bones*, and there causes much trouble by the disagreeable intense frontal headache. Inasmuch as these cavities are very difficult to reach I have devised the following procedure by which I succeeded to cure three obstinate cases.

I made the patient sit down on a low chair (rocking-chair) and bend his head far back, had him insert his right thumb deep into the oral cavity, in order to press the soft palate into the upper pharynx and thus to occlude the openings of the tubes. I then filled the nasal cavity with a very weak silver-nitrate solution (0.1 : 100.0). In this position, especially if the patient moves his head laterally, the solution penetrates into the cavities of the sphenoid and ethmoid bones; then the patient closes his nostrils with his left hand, and, while throwing the head forward until the face is directed toward the floor, releases his right hand. The solution now penetrates into the frontal sinus, and the patient makes a few lateral head motions, after which the fluid is allowed to escape. In this manner the diseased mucous membrane of the cavities named comes into sufficient contact with the remedy. Moreover, the patient himself has the sensation of the successful cauterization of the frontal sinus; I was unable to demonstrate it of the basilar and ethmoidal sinuses. The concentration of the solution is very gradually increased; intermissions being necessary from time to time to enable us to observe the possible effect. Where we have to deal with catarrh of the frontal sinuses alone, the Politzer treatment as recommended by Hartmann may first be tried, although I have not hitherto seen any good effects from it. As to the disadvantages of insufflation, they are chiefly the pains felt by some nervous persons in rare cases for hours, even half days, probably caused by the penetration of particles of powder into the neighboring cavities, which may happen even in simple insufflation from the pharyngeal space. Another disagreeable phenomenon is the immediate occurrence of profuse secretion of the entire naso-pharyngeal mucous membrane, which may persist for hours. The patients may need from six to eight handkerchiefs[1] until the end of the flow. But it is just this profuse secretion to which I ascribe the curative effect.

Now and then it will happen that the powder penetrates through the tubes into the middle ear, as is demonstrated by the patient's sensation and a subsequent inspection. Thus far I have seen no ill effect from it, although the accident has occurred in several of my cases. The strength of the powder is increased slowly. I cauterize three times per week.

As such cases are usually accompanied by copious suppuration, the cauterizations should be preceded by syringing; for only after thorough cleansing can the remedy actually come in contact with and act upon the diseased mucous membrane, which should, moreover, not be too wet in consequence of the syringing. For the latter purpose I let the patient carefully syringe the pharyngeal space on the same day of and previous to his coming, observe the effect rhinoscopically, and if necessary cleanse again; I then let him wait some minutes so as to have the adhering water run off as much as possible, before the cauterization is made. Of course, this is rather laborious, but the effect amply repays for the trouble.

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[1] Attention should be directed to using valueless handkerchiefs, as the silver-nitrate powder causes stains.

I am fully convinced that a large percentage of the unsuccessful treatment of naso-pharyngeal diseases is to be ascribed to the neglect of this simple manipulation. The fact that it usually requires considerable trouble to thoroughly cleanse a naso-pharyngeal space is certainly chiefly to blame for it.

In order to be convinced, it is only necessary to examine a subject little sensitive to rhinoscopy both before and after an ordinary nasal douche, and it will be found surprising how much has remained behind in the ridges of the recesses, between the prominences of the tubes, and the upper choanæ, especially in persons whose os basilare has a strong upward curve. In a few cases I only succeeded, by introducing a curved probe under rhinoscopy, in removing such accumulations of pus, beneath which, of course, I then found a freely granulating surface. What use, in such cases, is it to insufflate, brush, etc.? That touches only the pus, not the diseased mucous membrane.

While I formerly used the nasal douche, and later the English syringe recommended by Michel, I have, for about a year past, also abandoned the latter, because it often needs repairs, especially as, being factory-made, the quality is not always uniform. Besides I intended to have the force of the stream, if possible, completely under control of the patient, to enable him to increase, diminish, or interrupt it at any moment. With the abrupt discharge of the English syringe, clysopomps, etc., this is not at all, and in Weber's douche only imperfectly, possible. I therefore had a tin syringe cast to contain one hundred grammes, sufficiently thick to require but a short piston which every small lady's hand even could grasp. The syringe, which at the same time is provided with a short projection for aural injections, has attached to its point a rubber tube about fifteen centimetres long, and armed with an olive-shaped nozzle.[1] To use it, the patient introduces the olive-shaped nozzle into the nose with the left hand, while the thumb of the right is inserted into the piston ring, the second and third fingers into the other two rings, then the right hand slowly, but with increasing force, pushes the piston home. The main point is that the nozzle be directed strongly downward into the nose, that the stream may irrigate the lower and middle meatus. Otherwise the ordinary, much-discussed rules of the nasal douche are followed. I have invariably convinced myself that patients, particularly those with hard crusts in ozæna, had cleansed their naso-pharynx more thoroughly with this syringe than with the douche or the English (posterior nares?) syringe. In order to empty this as well as any other syringe most completely, it is essential to commence with a slow pressure, which is to be quickly increased to a force which accelerates the stream. However, it is easily learned, despite this procedure, how to empty the syringe at once, or half, at pleasure. Like others, I take the precaution to give my patients printed directions for nasal syringing. Under the above-described treatment with silver nitrate, which I have followed for two years, I have witnessed more rapid cures of naso-pharyngeal catarrh than by any other method known to me.

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[1] As the syringe is rather heavy, and does not permit inspection of its contents, I intend to try a similar article of glass, provided with a shield.

In chronic nasal catarrh uncomplicated with material participation of the pharyngeal mucosa, the *galvano-caustic treatment* is to be chiefly commended, the mucous membrane being cauterized with a thin spatula burner. Usually, however, a brief treatment with silver nitrate must be superadded, it being impossible for the burner to follow the variously irregular nasal bony framework invested with mucous membrane, which may be easily accomplished by the insufflation of the *caustic* powder.

Here I beg to insert some remarks about *galvano-cautery.* Since 1871 I have used the zinc-platinum battery of Voltolini, and must confess that it has never failed, but has always done me the same service by equal attention. Nevertheless, its well-known drawbacks—concentrated acids, etc.—caused me to hail with pleasure the battery published by Bruns in 1877. From that time forward, I have performed numerous operations with it (but with the employment of the modifications described below) which comprised all the procedures known to me in the naso-pharynx and ear (exclusive of the burning of foreign bodies), and I think thus to be entitled to an opinion as to its value. It is to be recommended in every way. Within the last few years, guided by experience, I have added to it what I consider to be improvements, which I will describe, presupposing familiarity with the original construction as described by Bruns.

First, I greatly increased the surfaces of contact between the carbon and the conduction, by applying to the upper ends of the elements a brass covering two centimetres in width, whereby the current is conducted directly without further intermediate connection by screws or other contacts; the conductions, therefore, being no longer dependent upon two small female screw-heads. Furthermore, I joined the zinc plates permanently by a pin, which here also leads the current without intermediate conduction. The hooks in the carbon and zinc plates formerly serving for conduction, now simply hold the elements in place. While in Bruns' battery (of two elements) there were twelve transmissions: two by soldering, four by contact, six by screw contact, there are in my modification only ten: four by soldering and six by contact. Aside from saving two transmissions, we have the advantage of dispensing with all screw contacts. I believe the screw junction the worst, because contact with a screw, which must be movable in its socket, cannot be as intimate as in contact procured by firm apposition. The longer a screw is in use, the looser it becomes by abrasion and polishing, thereby increasing the defect.

Another improvement is, that the battery is no longer set to one fourth, one half, three fourths, four fourths of its effect by elevation, but that I can produce an immersion from one centimetre to totality by a crank and toothed wheels. This enables me to bring to incandesence the finest burners for operations on the drum-membrane, as well as the coarsest applicable in the naso-pharyngeal space. With Bruns' deep immersion of even a single fresh element, the former fine burners would melt. It is evident that I save a great deal of power by such graduated immersion.

Finally, I have followed Stöhrer's advice to dissolve a portion of sulphate of suboxide of mercury[1] in the fluid. This is best effected during the addition of sulphuric acid, as the suboxide dissolves more easily in the warmed solution. With the use of this preparation the zinc plates are long preserved, as during the activity of the battery mercury is deposited upon them; the solution also lasts longer.

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[1] I take 40 gms. to 4 litres of solution.

By employing conducting cords composed of fine copper wire coated with silver[1] I expect to increase still more the power of the battery, the action of which has been materially increased by the above-described improvements. The care of the apparatus is given in the papers previously referred to. I only wish to point out that a bath is to be strongly recommended after repeated use. With me the elements are immersed every evening, if they have been in use at all, in two reserve glasses filled with warm[2] water. When the solution has become exhausted, the elements should be subjected to a general cleansing, after they have been three times immersed in water baths lasting each from six to eight hours, so as to remove thoroughly all the chromic combinations. When the elements are taken apart, the carbons are carefully washed, all metal parts cleaned with fine emery paper, of which various grades (000, 00, 0, 1, 2, 3) are kept on hand; the plate is newly amalgamated with mercury,[3] and after careful drying, requiring about 24 hours in a warm place, all parts are again put together.

Inasmuch as for the purpose of such thorough cleansing the battery is rendered unserviceable for two days, it is desirable to keep two reserve elements, which may at once take its place, and have besides the advantage of enabling us to exhaust weak elements, the substitute being on hand if an especially strong current is required.

Finally, I emphasize particularly that a correct service of the battery depends materially on very good care.

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[1] Pure silver wire is too expensive, even the plated wires costing double the price, but of course they act still better. (Tyndall.)

[2] Hot water is not practicable, as I have been informed by an artisan, because the upper part of the carbon plate contains wax, which would become softened and pass farther down.

[3] This may be done most quickly and thoroughly by pouring on the cleansed plates dilute sulphuric acid (1 : 6), followed by mercury, allowing it to cool, and then firmly rubbing it into the plates by hand until they are as bright as a mirror. They are then set up to allow the superfluous mercury to drain off.

Of handles for the loop I can recommend three—the universal handle of Bruns, the cutting-wire handle of Schech, and a handle which may at the same time serve for all the other burners I employ. The last, as regards size and heaviness, is intermediate between that of Bruns and Schech. Leaving a rather large loop, the wire is first drawn through the tubes; its ends are then inserted into the clamps of the handle; they are then passed on both sides through the holes in the axis of the margin, and simply bent sharply around; the superfluous lower ends of the wire are then cut off, and the loop drawn in by means of the ivory end to the required size. The handle is grasped in the fist; the third finger controls the ivory knob for the closure of the current. If held in the right hand, the thumb will turn the wheel by drawing it in; in the left, by pushing it away. With bent loop-tubes, the latter must have a right or left inclination, according to circumstances. The advantage of this instrument consists in this, that, owing to its construction, it acts only for brief periods at the time, so that the highest degree of the heat employed is constantly interrupted. On the other hand, the handle has the disadvantage that when employing steel wires the snaring progresses slowly, and that the steel wires easily burn through. Its application will be again touched upon farther on.

As to the kind of wire, I employ, on Voltolini's recommendation, exclusively steel wires 0.35–0.5 *mm.* in thickness; they are, in the first place, incomparably cheaper than platinum—a fact of some consequence when operating largely—they have, moreover, the advantage of greater elasticity, which renders it much easier to pass the loop through the nasal funnel in the most diverse directions around the part to be operated upon. Thirdly, they have a bright lustre—a fact of especial importance during operations under rhinoscopy in the upper pharynx. Opposed to all these advantages we have the single disadvantage that the steel wire is burnt through sooner than that of platinum. With practice we learn the knack to prevent even this, when we are enabled to feel that the loop is all around in contact with the swelling, as the wire will burn through only in the open air.

Regarding galvanometers, I do not consider them of much value for galvano-cautery; it is even impossible to get a correct estimate of the great variety of burners and loops, especially as the latter with progressing diminution must become more strongly heated. My estimation consists in this, that I simply cause the burner to glow shortly previous to the operation,[1] and produce the desired intensity by either greater or lesser immersion of the battery. Where it is an object, especially in operations on very vascular organs, to find the required intensity for the loop, I have invented a very simple little galvanometer consisting of four bits of tubing soldered together. Through their lower ends, which are screwed into the clamps of the handles, a wire is drawn, bearing in front a loop of the size required for the operation. I then find the desired intensity by immersion of the battery, and on employing the same quantity of current with the loop actually used, I am almost certain neither to melt the wire, nor, on the other hand, to cause the patient unnecessary hemorrhage or pain by an inappropriate strength of the current.[2]

For the loops, I employ, like everybody else, plain double tubes.

For the burners I use in some cases the above wheel-handle; namely, when I desire to have a support in my hand and to exert pressure at the same time. Otherwise I take a very small, light handle, which can be easily directed with three fingers—two for holding, one for closing the circuit. With such a one we can operate very nicely and accurately; therefore it is especially suitable to operations in the ear, those through the nasal funnel from in front, and those under rhinoscopy; I now use it almost exclusively.[3] It consists of two strong brass wires set in wood, provided with a lateral key as circuit-closer.

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[1] But take care! Fine burners are burnt through in an instant in the open air.

[2] It is not feasible to try the intensity with the loop to be used in the operation, because after a single incandescence the steel wire loses elasticity and brightness—its two valuable qualities.

[3] It is only 4.5 *cm.* long, and weighs 25 *gms.*; Voltolini's bone-handle is x *cm.* long, and weighs 69 *gms.*; Bruns' universal-handle is x *cm.* long, and weighs 91 *gms.*

In the anterior part of the eyelets the burners are to be inserted and screwed tight. I shall discuss the latter under the respective operations.

Now, to return to our naso-pharyngeal affections, we find, besides the previously-discussed disease of the mucosa, often the so-called

Adenoid vegetations.

In the lower and middle pharynx we find them sometimes very numerous, small, like fish-spawn; sometimes plentiful and larger[1]; again they are isolated broad masses, or or isolated and small; occasionally the disease affects, rope-like, the mucous membrane covering the pharyngo-palatal muscles[2]; but never have I seen a complete adenoid degeneration making the entire mucous membrane bulge, as is frequently found in the highest part of the pharynx. All these forms, of course, merge into each other in numerous degrees.

If the vegetations are numerous, it is always best to first cauterize the lower and middle pharynx by from six to nine insufflations of silver nitrate, so as to overcome the general swelling of the mucosa; then to make a pause of one week, and thereafter to destroy the remaining vegetations with the spatula burner bent upon the flat side, using them in various widths and lengths and a thickness of about 0.3 *mm.*[3]

If they are numerous, a small portion should be taken at a time; they should be burnt but superficially and rather repeatedly, the object being to touch the thin mucous membrane only and to avoid scars.

Of great importance are the adenoid vegetations in the upper part of the pharynx, the credit for the first demonstration of which belongs to Wilhelm Meyer.

According to my experience, gained largely by rhinoscopy and digital examination, within the last four years here in Hamburg, where these affections of the pharynx are truly endemic, owing to climatic causes, they may be divided into the following chief categories.

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[1] Both forms are usually denominated pharyngitis granulosa.

[2] Schmidt, of Frankfort-on-the-Main, has made of it a special pharyngitis lateralis.

[3] Many former attempts to remove the granulations with silver nitrate or 90-per-cent. carbolic ac. solution have proved failures in my hands. Cauterizations with zinc chloride may perhaps succeed, but are attended by too many inconveniences, even dangers.

1. Those of the *pharyngeal tonsil*, and

2. Those of the *tissue underlying the mucous membrane.* Where we have to deal with simple hypertrophy of the pharyngeal tonsil, the latter is seen either split in a sagittal direction, like the stalactites of a subterranean cave, but often projecting as far as the upper wall of the soft palate, or curving downward like a parcel, with rather smooth surface. In both forms, the pharyngeal hypertrophy covers almost constantly a lesser adenoid degeneration of the investing mucosa.

3. *General adenoid degeneration of the entire mucosa*, which is seen to be swollen, partly occupying the naso-pharyngeal space, with uneven surface. The tubes are seen less sharply defined than usual.

4. *Proliferation of the same tissue*, but resembling the first form of proliferation of the pharyngeal tonsil, yet to be distinguished by the less smooth surface. In the third and fourth forms, the palpating finger has the sensation as if the pharyngeal space were more or less filled with worms, so rapidly does the slippery surface of the granulations escape from the examining finger.

5. *Combined form of the affections of the pharyngeal tonsil and mucosa.* In this variety the entire pharyngeal space is usually found as if stuffed. The palpating finger has the sensation of the swelled tissue merely.

All these proliferations are best diagnosticated by rhino-pharyngoscopy and digital examination, the former of which, as above said, is of materially greater value.

Their removal requires energetic treatment. Cauterizations, as recommended already by Meyer and later again indorsed by Politzer, appear to me quite insufficient. It is merely necessary to read reported cases, *e.g.*, those of Ganghofer, in which oft-repeated cauterization was required. This is much better accomplished by galvano-cautery. If there are only the slighter forms which encroach only upon a small portion of the pharyngeal space a few strokes of the galvano-cautery suffice, the operation being performed under rhinoscopy or digital direction by a spatula burner, or from the oral cavity with a bent instrument. The more developed forms, especially the proliferation of the pharyngeal tonsil, require more energetic interference.

Since Meyer has devised his circular knife, he has had numerous successors who proceeded from in front, usually the mouth, with all possible instruments intermediate between scissors, forceps, and hollow chisels, to destroy the vegetations by pinching, tearing, twisting, and crushing. All these procedures bear the stamp of force, cause profuse hemorrhages, certainly are painful, and require numerous sittings.[1]

Inasmuch as the operation of nasal polypi by the forceps, etc.[2] (cold snare), is now generally condemned, and the galvano-cautery recognized as the most correct method, so here, too, the time cannot be far off when the galvano-cautery, as I maintain, will be regarded as the only one justifiable. That this has not heretofore been done is due to the fact that this more laborious method, on account of the battery belonging to it, is thus far almost everywhere in the hands of specialists.

The *galvano-caustic* operation may be performed from *two points*, either the *nares* or the *pharyngeal space*.

Operating in the former manner is done either under rhinoscopy or by digital direction, or, where the nostrils are very wide, under guidance of the eye from in front.

Operations under rhinoscopy require practice on the part of the physician and of the patient. In such cases, I simply introduce the cold burner through the *widest* nostril, and attempt rhinoscopy while the patient depresses his tongue with Türk's instrument, or by employing my modification of Ash's tongue-depressor. A few individuals are so quiet under it that the inserted burner may be moved in the pharyngeal space without exciting contraction. They are qualified for immediate operation.

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[1] The main objection I have to them, however, is the uncertainty in the operation, particularly with sharply pinching instruments, among which Löwenberg's forceps stands at the head. To me it is utterly incomprehensible that the tubes are not often quite seriously injured, where a man proceeds at haphazard, guided neither by eye nor the palpating finger, into the pharyngeal space, and grasps whatever he can get hold of.

[2] Regarding the advantages of the various instruments under this head, I refer to Catti.

The majority cannot bear it. For such patients I prescribe a well-rounded German-silver rod, fifteen centimetres long and three to four millimetres thick, which they introduce several times daily into the wider nostril and move it about in the pharyngeal space, while they at the same time vigorously depress their tongue with a spatula (spoon-handle). If they have practised that well, the operation sometimes can be performed, but usually it does not succeed even then.

In any case, these operations are among the most difficult, as has been already pointed out by Bruns and Voltolini. While performing them I always "labor in the sweat of my brow," and the patient likewise does his best ; still we must never forget that just the operations under rhinoscopy are the only ones in which the effectiveness of operating can at all times be exactly watched so as to prevent injury to the patient.[1]

The destruction of the pharyngeal tonsils I effect in these cases by simple spatula or furrow burners (see below), by bending the platinum in such manner as to make the burner sink hook-like into the hypertrophy from behind and destroy it when drawn forward. Or I employ the scythe-burners in the same way. The latter consist of copper wires two millimetres thick, one of which bends above in scythe-form, continues transversely for twelve to fourteen millimetres, according to circumstances, and then, being bent again, runs again in the direction of its first part ; but at a distance of two millimetres its course is continued in a platinum wire to which it is soldered, so as to return to the point of origin, where it joins the second returning copper wire. When the instrument is applied behind the proliferation, the platinum wire closely hugs the upper pharyngeal wall, and when rendered white-hot and drawn toward the nasal septum, it destroys the proliferation.

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[1] I have had attached to my illuminating apparatus a contrivance which supports my left operating wrist during this method of operating, whereby, therefore, the light reaches the mirror from below my left arm. In future I hope to facilitate my work still more by the very great conductivity of silver and by a new mode of its attachment, which, however, I shall have to try first.

In certain formations the wire snare may be employed in like way. But it is not always easy to apply the snare in the desired manner, especially as Mitteldorpf's saying, "how clever the snare is," is but seldom verified. If we require manifold movements of the snare-holder, contractions easily ensue which produce an irritability rendering further operation impossible. By employing the burner a material advantage is offered the physician and the patient in my instruments, by the smallness of the handle, facilitating every movement, and therewith lessening the pain.

The operation for proliferations under rhinoscopy with introduction of the instrument from the pharyngeal space has not been successful in my hands. Too many instruments, depressor, mirror, and burner, have to be guided alongside of one another in the relatively narrow space, so that a still greater practice is here necessary to secure good results.

It is different with the operation under digital direction, which is always preferable in children. In them I also introduce the scythe-burner through the nares, then bring it into its correct position by the finger of the other hand introduced through the oral cavity, and make it glow. In using the scythe-burner, the action of which here is excellent, the point of the guiding finger is protected from being burnt by intervening space, so that we have the advantage of controlling the incandescent instrument by the palpating finger.

Another way of removing the vegetations is that with the S-shaped instrument used from the mouth.

For these I employ three burners: 1. The semicircular burner, two copper wires bearing a semicircular platinum wire in front. The patient's tongue is depressed; the instrument, bent off in front, is introduced by crowding it first laterally between the base of the tongue and the arch, by then holding it exactly in the centre, and carrying it far up until the nasal septum is felt, to be recognized by the gliding of the semicircular burner, in being moved to and fro, across a sharp ridge from one choana into the other; the burner is then lifted up along the septum as far as the upper pharyngeal wall, or rather the proliferations covering it; is brought to incandescence and drawn downward, keeping exactly in the centre. This method is the simplest of all, accomplishes much, and is to be pre-eminently recommended in the fascicular proliferations of the tonsil. I should employ it in all cases, were it not that this method of operating is usually followed by considerable pain and in several cases by contractions of the muscles in the region of the back of the neck. Thus far I do not quite understand why they occur; it could only be through injury to the accessory nerve, which however cannot be reached at all; the only structures which could be touched by deep insertion of the instrument are fibres of the longus cervicalis muscle. A colleague operating with my burner had the misfortune to have the patient undergo right-sided contracture of the muscles for several months, causing no little alarm to the parents; but probably he had proceeded too energetically and had deviated from the middle line. For that reason I employ the procedure only in great hypertrophy of the entire tonsil and avoid penetrating too deeply.

2. An instrument on which I have been at work for years is my thimble-burner. It consists of two very flexible conducting cords composed of well-silvered copper wires which lead to the proper platinum wire attached semicircularly to two thin silver plates. One of the conducting cords runs backward, not directly to the battery, but to a small circuit-closer held in the mouth of the operator, and which effects the incandescence by being bit upon at the appropriate time. The application is very simple: I take the circuit-closer between the teeth, carry the finger armed with the burner into the upper pharynx, as during digital examination, again palpate the vegetations, withdraw the finger behind them, make the instrument glow, and lead it in an easy curve toward the vomer. Although I have operated with it seven times very successfully, I intend to improve it still more, and give it here only a preliminary notice.

3. The employment of the snare from the oral cavity, which I formerly used in various ways, I have been able to dispense with, especially as it is not easy to introduce even moderately large snares into the upper pharynx of children, unless very thick wire is taken. The snare almost always bends, often during vigorous contraction of the muscles around the entrance to the pharynx, even so much as to make it impossible to draw it in. On the other hand, taking, like Michel, very small snares, many sittings become necessary, so that the poor children have to undergo a severe ordeal. I use therefore the snare only in adults, whose pharynx is but little sensitive. I am now at work on a special contrivance for the easy introduction of large snares with which I have not yet operated: I shall publish it in future should it prove practical.

Of the instruments here discussed, the scythe-burners introduced from in front have thus far done me the greatest service. In adults, all these methods cause no material difficulty, but children require much coaxing and many little tricks. I almost always conquer by accustoming the little patient to the introduction of instruments, and then attain my object quickly! Frequently I have the parents insert the above-mentioned German-silver rod several times daily through the nose into the pharynx, which soon makes the children less sensitive, and prepares them for the operation. Coaxing is very effective with these little people; it is easy to gain their affection and confidence, only they must never be told an untruth. I tell every child in advance that the introduction of the finger is very disagreeable, or that the catheter in the nose tickles and presses somewhat, then I coax, but do not desist even if I have to tie them. Afterward I praise them, and therefore they willingly return to me, despite the operations; one little boy, Moltrecht, five or six years old, who had been several times operated upon, even subsequently envied his sister who came under my treatment, and inquired if his turn would not soon come again. Some children positively cannot be conquered by kindness. For these I have constructed an operating-chair which I exhibited at the Baden meeting of naturalists and physicians. It is made of wood, cane, and iron ; has a movable seat for the smallest children and for adults, also adjustable to the various inclinations of the body. The head is completely fastened, and also can be set in various inclinations to the body. The seat may be narrowed or widened; hands, arms, chest, thighs, and legs are completely secured by bandages. The chair may be rolled to and fro, be it full or empty. The child is so secured as to make it handy for the operation ; usually not even an assistant is required to guide the oral speculum, which is done by the left hand of the operator, as described under digital direction. Many children, feeling powerless in the chair, become tractable and open their mouth readily ; others remain stubborn : then we proceed as directed above, in the worst cases Sachs' feather proving effective.

The chair has another advantage : it serves as a warning. For instance, a little three-year-old boy decidedly opposed every attempt at catheterization. After much coaxing I lost patience, bound him tight in the chair, and catheterized him. Thenceforth he permitted the catheterization willingly, but not without first casting a tearful, sidelong glance at the operating chair.

In general, however, the chair is but rarely needed, say in from five to ten per cent. Children readily endure the galvano-cautery ; I have even found the subsequent procedures easier than the first, because they have become convinced—which all reasonable persons operated upon have admitted to me—that these operations in the upper pharynx by galvano-cautery are nearly painless ; but all concur in this, that the introduction of the finger into the pharynx is the worst part of it, not the burning.

I may add, in a general way, on the subject of operations on vegetations, that in my opinion too much operating is done all around. In the first place, it has frequently occurred to me that children were brought to me with the statement that the proliferation was seen to extend halfway into the choanæ. In such it did not appear credible to me that the symptoms of occlusion could have been produced by the partial obstruction of the nasal passages. Careful anterior rhinoscopy then showed that the inferior turbinated bones were the cause. In such it is unnecessary to operate on the vegetations without first having made room in the nares. Unfortunately it has become the fashion to examine with the finger every child presenting the suspicious symptoms, and, if there be any vegetations present, to attempt their most thorough extermination. I therefore advise to substitute, wherever possible, rhinoscopy for digital examination, and if that be not feasible, to make at least an exact anterior rhinoscopy, in order eventually to undertake the operation from that point. I shall return to this subject hereafter. Strange to say, the smaller children (not quite excepting the large ones up to twenty-five years) are much opposed to examination with the nasal funnels, thinking that something extraordinary is to be done with them, and they must first be accustomed to them, for which purpose I generally use Cramer's otoscope, with which at the first examination almost nothing can be seen. Of course, small masses of vegetation must often be operated upon if they cause aural symptoms by obstruction of the tubes. What has been stated above refers only to vegetations producing nasal obstruction and its sequelæ.

Smaller vegetations, especially if associated with hypertrophy of the pharyngeal tonsils, diminish decidedly by the use of bracing North-Sea air-baths, among which I enumerate pre-eminently Helgoland, then the islands situated on the Frisian, Belgian, and French coasts. The baths of Sylt, St. Peter, Büsum, and Scheveningen have more inland air, unless western winds prevail. Baltic-Sea air is too mild. Obviously, nothing can be expected except from the prolonged influence of these agents,—four to six weeks is the least. Repeatedly I have observed vegetations to recede by these means, so that I desisted from operating. Supplementary thereto are several daily irrigations of the nose, consisting of one-half to one-per-cent. salt solutions poured simply by means of a teaspoon or a small glass into the nares, while the head is leant back. The more strongly the head is inclined backward, the more transient is the effect of the bath, and the more readily does it reach the middle and upper nasal passages: it is best to change the inclination of the head.

These nasal irrigations are excellent for softening crusts, etc. In acute coryza, too, I have employed them latterly with good effect when combined with silver-nitrate insufflations, so that this treatment is well deserving of a trial. The most important part of it, of course, is the insufflation with silver nitrate in the above-described manner. The cauterization is performed every other day, the irrigation three times daily, especially in the morning. To entitle me to a decided opinion as to their value I need greater experience; in three or four cases the acute coryza had completely vanished after about three applications.

Also in reference to the operations that are indicated, I am far from the opinion that we should shave clean the entire mucous membrane with its proliferations and the underlying hypertrophies; because Nature certainly has her reason for placing glandular organs in the upper pharynx. I endeavor to restrict myself as much as possible to remove only what is morbid; therefore I never operate in quick succession, but allow at least three weeks to elapse before every new procedure. Rapid operating I hold to be erroneous, if for no other reason than because we are unable within a brief time to separate satisfactorily the consequences of wound reaction from hypertrophy. Moreover, experience teaches me daily that, after partial destruction, these glandular organs atrophy spontaneously. This shows itself most strikingly in the palatal tonsil, which in its structure closely resembles the pharyngeal tonsil.

I think I owe it to this principle of always first to await the result of an operation, that I have repeatedly succeeded in attaining ample success with a single procedure. I have had only one little patient in Hamburg who required six operations.

These results should be appreciated in reference to the strain to which the children are always put, when we read of cases in which among other things twenty-five repetitions are reported (Ganghofer). A quite renowned throat specialist in Germany also told me that his method (application of small snares) often required six, twelve, and even more sittings.

As to the age of children, I have operated on patients as young as two and a half years. It is better, for obvious reasons, if possible, to await the fifth year, if postponement be permitted by the circumstances, especially by the often complicating ear affection. The older the child, the wider the organs, the easier the operation, the better the result.

In connection herewith I proceed to the

Formations Obstructing the Nose.

In most of these cases we have to deal with hypertrophy of the naso-pharyngeal mucous membrane, affecting with greatest intensity the lower turbinated bones, where it is associated with like disease of the underlying cavernous tissue. The hypertrophy of the middle turbinated bones, although usually slight, produces, nevertheless, grave symptoms, because the nasal cavity here is generally narrower, and complete occlusion of the canal is more rapidly effected ; the sense of smell is likewise usually interrupted, for, the turbinated bone pressing against the septum in front, the passage of odoriferous substances by the olfactory epithelium which is there developed is no longer possible.

According to the degree in which the cavernous bodies[1] of the lower turbinated bone participate in the affection the symptoms will vary. In the dorsal decubitus, after ingestion of much nutriment or strong drinks, especially in the evening, the symptoms of occlusion become more pronounced. If the patient (with bilateral intense disease) at night has lain for some time on one side, the occlusion on the same side becomes greater, while the other clears up. The diagnosis is easily made. According to Michel, it is to be recognized by pressure with a strong probe ; the normal mucous membrane can be but slightly depressed, in the abnormal the probe often sinks out of sight. Both inferior turbinated bones are so hypertrophic, even in their anterior parts, that on lifting the tip of the nose they may be seen like two red balls. How often such unfortunate patients have been maltreated by physicians who, mistaking these proliferations of the mucous membrane for polypi, worked with dressing and other forceps, with or without fracturing of the turbinated bones, but always causing the most violent pain and usually profuse hemorrhage. I have repeatedly seen such patients from whom one half of the turbinated bone had been successfully removed. In one case the hemorrhage could be arrested only after twelve hours' exertions. On rhinoscopy the posterior ends are seen as two large, usually whitish bodies occluding almost completely the entrance to the choanæ. The color of the proliferation changes, according as the mucous membrane or the hypertrophic cavernous bodies participate more largely, from dark bluish-red to a much brighter red ; while the ends of the lower turbinated bone, rhinoscopically visible through the choanæ, appear pale yellowish-gray, uneven, bearing the greatest resemblance to white raspberries. The cause of this aspect is to be ascribed to the connective-tissue framework, which of course cannot participate in the same degree as the vessels and the loose mucous membrane.

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[1] Fright and anxiety materially influence the blood supply, as will be seen later on.

The diagnosis is more difficult when the swellings diminish through the influence of temperature or psychic causes (dread of the examination), which often occurs within a very short time. A timid young girl, who had already assumed the correct position near my illuminating apparatus for the operation of these hypertrophies, exhibited on inspection an almost completely occluded left nostril due to hypertrophy of the turbinated bone. I went to the battery, immersed it, seized the operating instrument so as to introduce it into the naris through the funnel, barely consuming one third minute, when, to my great surprise, the swelling had disappeared and the nostril was free. I at once took in the situation, the girl lay deathly pale in a faint. I utilized the moment, and inserted my furrow burner deep down to the bone into the relaxed cavernous tissue, and drew the white-hot instrument forward through the entire length ; at the same time the cavernous body on both sides filled with blood, and the girl had regained consciousness, not through cold water, but by hot fire.

We should be acquainted with such *temporary reductions*, lest we be deceived by them. Since my attention has been directed to them they have not rarely came under my notice. They are mostly caused by anxiety of the patient, and are almost always associated with pallor of the face. After they have been seen a few times, these hypertrophic, cavernous bodies will not be mistaken even in their relaxed condition; we see the posterior two thirds of the lower turbinated bone not, as usually, equally rounded, but sharply defined below, like a gray, loose bag, filling the greater part of the inferior meatus; the cavernous body can be easily depressed deeply and moved to and fro with a strong probe. If the patient is encouragingly addressed, and caused to bend his head forward and downward, the swelling generally soon returns, but not always, probably because the vaso-motor nerves are still influenced by the central nervous system in the same manner as during the falling of the swelling. If still in doubt, repeated rhino-pharyngoscopy soon leads to certainty.

The *causes of the affection* are generally to be sought in the continually recurring and persisting nasal catarrhs. Probably the strongly-developed cavernous bodies are often congenital; but a considerable number of such cases, in which preceding nasal catarrhs were denied, seem to me to indicate that these swellings may be simply due to the continued passage of water-laden air during respiration. For that reason they are so frequent with us in Hamburg, because our air is saturated with water in almost any direction of the wind, from the large water-sheets of the Atlantic, the marshy regions, the Baltic, and the Elbe. This quality of the respired air is not indifferent, as it is well known since the researches of E. H. Weber, that by pure water the epithelia of the mucous membranes swell and even burst. Thus our population breathes day and night largely water-laden air, and is particularly injured by the numerous watery deposits and fogs, often lasting for weeks, so that here is the true Eldorado for chronic naso-pharyngeal affections.[1] If Hamburg were situated close to the sea, so that this moist air were salty, we would be better off, as proved by the good results at Helgoland.

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[1] My own formerly quite healthy child of seven years, now, after a residence here of four years, has shown the last year the well-known symptoms, and, unfortunately, examination confirms the proliferation in the upper pharynx.

In former times I have annoyed my patients with brushings and insufflations of caustic remedies, but without lasting effects. They are useless. The cold snare likewise is not to be used—it meets with too much resistance. Strange to say, the sharp spoon has been recommended, but is to be completely rejected, like all the various pinching and tearing forceps which may perhaps be less objectionable. They all have to yield to the certain, and here easily applicable, galvano-cautery. The only thing which might be tried besides galvano-cautery would be intense cauterizations; but I emphasize that their effect must be watched by the eyes; that is, the cauterization should be done under early anterior rhinoscopy through the nasal funnel so as to hit the right spot.

Here the galvano-cautery is in its proper place. I employ my small, light handle, which I direct with three fingers, and apply the various burners. For marked hypertrophy of the inferior turbinated bone I use my furrow burner (see above). Having immersed the battery so that the intensity of its current suffices for white heat, I introduce it deeply, the concave side of the platinum directed toward the bone, and if permitted by the size of the hypertrophy of the anterior portions I prefer to go as far as the pharynx, but always gliding upon the turbinated bone. By sufficient attention I can feel when the burner glides beyond the posterior end of the cavernous body into the pharynx; if on drawing it forward I feel resistance at that point, its position is correct; I now draw it vigorously into the swelling as far as the forceps part, heat it twice in quick succession, and draw it forward, always aglow, in the same direction in which it was introduced. It is proper here not to bring the burner quite to the anterior end of the lower turbinated bone, because the pain, not very slight at best, materially increases on nearing the front. Of course, the extent of the hypertrophy will decide whether cauterization up to the anterior third suffices. The burner here must not be torn off, but should be *lifted off aglow;* otherwise the eschar from the burn will be likewise detached, and we have severe hemorrhage. I then introduce, in place of the furrow burner, the spatula burner of about 4 millimetres breadth and 0.3 millimetre thickness, procure the proper intensity of current, place it as far backward as possible, that is, at the place where the furrow burner began to act, and draw it forward at the upper margin of the wound just made, then introduce it for the third time, and burn the lower margin of the wound. Such a thorough burning has an excellent effect. After from six to ten days a broad, thick, eschar separates, which I usually loosen with the probe at that period, so as to obtain it whole and rid the patient of the obstruction, but lightly and carefully, so as to avoid hemorrhage. I then allow at least three weeks to elapse to await cicatrization and its effects. If the result is still insufficient, I operate again, with furrow or spatula burner, according to indication; usually a single operation suffices. The pain of such operations is generally felt in the teeth of the upper jaw.

We now come to

Nasal Polypi.

No matter whether ordinary mucous polypi as usual, or fibroid polypi, the most correct method of their removal is the galvano-cautery. A suitably formed snare is passed through the nasal funnel by pushing it along the septum, with slight movement, below and behind the polypus; for the purpose of having it glide better, as high as possible along its root up to its point of origin; then the snare is tightened until firm resistance is felt, is brought to incandescence, and completely drawn in. For the removal of polypi the handles of Bruns and Schech are better adapted than mine, as no considerable hemorrhage is here to be anticipated.

The large polypi, generally springing from the middle turbinated bone, are easily operated upon. If we have to deal with numerous small ones, which are met with especially in cases formerly operated upon, and the snare cannot grasp a whole bundle at once, we take only those larger than a pea, then use a white-hot spatula burner, simply lay it on and press it deeply down to the point of origin, and thus destroy the whole of the small proliferations until nothing of any consequence remains. It is advisable always to keep ready three or four tubes armed with wire. If the field of operation is not clean, water is syringed through the other nostril so as to make it remove the ragged tissue and blood clots from behind; inversely they might be forced into the tubes, and there produce otitis media—an accident which unfortunately occurred to me. After one nostril has been freed from polypi, the patient usually has enough, even if the other side is affected in the same way, which latter is taken in hand after the lapse of eight or ten days. Parts of still remaining polypi are not again attacked before three weeks. In the case of large polypi, which reach down into the pharyngeal space, we often fail in grasping them from in front alone by simple introduction of the snare, but we are obliged to go into the mouth with the finger of the other hand, and place the snare around it.

A young man came to me with an enormous polypus filling the greater part of the pharyngeal space. Several physicians had already worked at it with snare and forceps, but in vain. To me the operation appeared very simple; but lo! even I could not get the snare around it through the nasal funnel. The very submissive patient bore the introduction of the finger for only a moment; gagging and nausea at once ensued: in short I could not grasp it. A happy thought struck me: I saw the root of the polypus spring from the middle turbinated bone, took my scythe-burner, inserted it straight through the nasal funnel, the bent end turned downward, pushed it under the root, then directed the bent end upward, so that the root of the polypus lay in front of the platinum wire, tightened it, made it glow, severed the root with the burner without causing pain or hemorrhage, and the patient the next moment spat out the immense polypus into the handkerchief, and was delighted to be rid of the troublesome symptom.

Should a similar case occur again I shall employ the scythe-burner from the start.

After completing the polypus operation we should direct attention to the fact that even if all the polypi seem to be destroyed their point of origin requires some supervision during the next months. Wherever a suspicious spot is found it is removed with the scythe-burner. If after the lapse of about a year nothing suspicious recurs we may feel secure. Unfortunately but few patients are reasonable enough to follow this advice. They are glad to be rid of the annoying symptoms, and do not return until they recur, which of course takes years.

In those cases in which, after removal of the hypertrophied mucous membrane or polypi, some nasal occlusion remains behind by reason of the narrowness of the bony structure, we have reached the end of our therapeutics; the results obtained by Ruprecht with his compression-forceps do not stimulate us to imitation. Voltolini recommends the burning away of the strong projections of the septum, and in small deflections of that nature I have followed his advice with success. I have abstained from the burning away of large projections, because I should have produced a perforation, in the beneficial effects of which I have less faith than some authorities.

In many cases hypertrophy of the cavernous bodies covers the turbinated bone so greatly and completely, that we are obliged to operate first on the anterior parts, and then turn to the posterior ends, which of course requires double or perhaps more procedures.

Although the hemorrhage is very slight, I always let the patient wait a while after the operation, and meantime tampon the nose from in front; let him sit bent forward and receive any blood in an empty glass vessel, so that I can estimate its amount. Then I let the patient wear for two days purified sheep's wool formed into a ball (as above described) at the entrance to the side operated upon, to keep off draughts and dust. The patients wear it willingly, especially as it does not occlude absolutely as cotton does.

If besides hypertrophies of the inferior turbinated bone the nostrils are narrow, it may easily happen that despite every precaution the septum is injured (radiant heat), and that on cicatrization both organs become opposed, and after removal of the eschar the two opposite wound surfaces adhere to one another. In such cases I introduce three times weekly a tortoise-shell plate ten centimetres long, one centimetre broad, and one centimetre thick, until the wound swelling, and with it its danger, is past.

Formerly I operated with the snare, which offers the advantage, that we obtain the spherical ends of the turbinated bone with one effort, until I had the misfortune twice to remain impacted with the snare: once it tore, and I escaped with a pretty severe hemorrhage; the other time it stuck immovably, and could neither be torn nor burnt. With much effort I finally got it out by pushing it backward. On examining several specimens I easily found the cause. At the point where the mucous membrane of the pharynx merges into that of the nose it is very thin, and is firmly attached to the bone. If the snare comes to be applied to this spot it gets to the bone at once, and burns itself into it. From that time on I ceased to operate on these formations with the snare, and used the furrow burner. Latterly I have also employed the scythe-burner with advantage, and in great hypertrophy of the posterior turbinated bone I think it more rapid than the furrow burner; but I desire to gather more experience on this point before I shall recommend it unqualifiedly. The application is simple. It is introduced straight, and when in the pharynx it is turned laterally; the turbinated bone is thus seized, the burner heated and drawn forward.

Ozœna.

As to ozæna, I believe it to be the direct consequence of chronic purulent inflammation of the nasal mucosa, from whatever cause produced. Numerous histories gave their origin in continuous coryza, which, especially in narrow passages, finally leads to almost permanent chronic inflammations of the mucosa, the purulent deposit of which remained unheeded for months, even years, in spite of all stench. Certainly, in many of these cases, bad nourishment, scrofulosis, tuberculosis, and syphilis may have contributed, but I do not incline to look upon them as the fundamental causes. Just here in Hamburg there is a great deal of ozæna, and I even observed it frequently in otherwise well-nourished individuals in whom the above causes must be excluded. I do not here touch upon the well-known treatment; it is elsewhere described in detail.

The prognosis is bad, for what is buried will not be resuscitated. The destroyed organs cannot be re-created. We must limit ourselves to combat the troublesome symptoms and to prevent the progress of the disease. Almost all the resources of therapeutics have been exhausted for this disagreeable affection. The first is thorough cleansing of the naso-pharyngeal space of the offensive, inspissated masses of pus, in the manner fully given above under the description of my syringe, frequently combined with supplementary nasal douchings, to be carried out in the beginning three times daily.

I emphasize particularly that I make the success depend on such thorough cleansing of the naso-pharyngeal space. Gottstein published two excellent papers on the treatment of ozæna by means of tampons; I have also seen good effects from it, only my patients will not get used to the wearing of the tampons, even alternately and for but a few hours a day. My treatment now is the following: I first inspect whether there are any proliferating portions of the mucous membrane, such as are easily found in ozæna, especially at the middle turbinated bones—conditions to be designated as precursors of atrophy. These I cauterize superficially. The rest of the mucous membrane I treat a few times with cauterizations of silver-nitrate powder in the above-described manner, and thereby obtain within a short time an essentially clean appearance of the diseased parts. I then employ gypsum-tar (℞. Calcii sulphatis, 100.0; Picis liquidæ, 25.0. S. Pulvis subtliss.).[1] The patient receives four[2] of the above-described glass tubes and a piece of rubber tubing. He takes up as much as the bent part of the tube will hold, and with his mouth blows the powder in several doses into his nostrils. At first this insufflation is required twice daily; the powder with the purulent scabs forms dry brittle masses which are removed by the next syringing. The offensive odor soon diminishes, only a slight smell of tar of course remains perceptible, which is one hundred times more sufferable than the vile smell of stinking pus, or of thymol which is used by preference on the tampons by some physicians.

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[1] The attention of the druggist should be called to the fact that the powder must be produced very fine and uniform, that it may easily be blown through the tube.

[2] Any mechanic, glazier, etc., will undertake the manufacture of these tubes for the patient for a slight remuneration.

With this treatment I have attained excellent results, among them three quite desperate cases; that is to say, I have brought them to the point that the patients continued well with perhaps three syringings per week or at most one per day, without gypsum-tar or other remedies. I think it indicated, after discharge of the patients, to make them wear purified sheep's wool in each nostril, as described at the beginning of this paper. This acts as a protection against sudden chilling of the anterior nares, from which the cavernous bodies, which warm the respired air, have often completely disappeared, as also against dust and other impurities which irritate the mucous membrane.

Also for the *operation on*

The hypertrophic palatal tonsils,

under certain circumstances, the *galano-cautery is especially indicated*, even indispensable.

Ordinarily I operate with Matthieu's tonsillotome, of which I have four different sizes, and with good results. I do not share Hedinger's view, who desires to see galvano-cautery employed only as a safeguard against hemorrhage; he cites four (?) fatal results. Among a very large number of cases operated with Matthieu's instrument I have witnessed only once a serious hemorrhage, where against my will the greatly hypertrophied tonsil slipped through the ring and was completely extirpated. Ordinarily I only take a part. Dieffenbach's operating "on the fly" I have not hitherto seen by any surgeon, it was always more of a hacking off. If the patient keeps very quiet and depresses the tongue well, it is of course no masterpiece to remove it with one sweep; otherwise, especially with children, it is decidedly difficult. Neither am I in favor of directing the section from above downward, but rather from below upward; it once happened to me that one tonsil, well separated with the knife except the lower sharp bridge, slipped from my hook toward the larynx, so that it cost me much trouble to remove it with the scissors. The majority of cases of fatal hemorrhage have been operated upon with the knife, with which, of course, we are much more liable to injure the carotid by a false lateral sweep than with Matthieu's tonsillotome, which protects the surroundings. That we should be able to reach the carotid with it at all, I believe to be impossible from an anatomical point of view.[1] An accident may be due to a very abnormal formation, but for that no operator could be made responsible (see Luschka, "Schlundkopf," etc.).

Only in small or anæmic people, and where the tonsils are excessively developed and betray already by their external appearance great vascularity, I operate, with reference not to an arterial, but profuse venous hemorrhage, by means of the galvano-caustic snare, which, as a rule, cuts very smoothly; and during the employment of my wheel handle I have had only minimal hemorrhage. A rather coarse wire should be chosen for it, otherwise it will be difficult to place, as during every gagging motion the tonsil is slightly withdrawn and the snare is easily slipped off. In a case of that kind, in which the first tonsil was removed quickly and almost bloodlessly, the snare on operating on the other tonsil was stripped off four times by the now greatly irritated pharynx, until finally the fifth attempt succeeded by the finger of the other hand holding the snare behind the tonsil until it was drawn in—a procedure which I commend any way for cases in which much gagging occurs.

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[1] The hemorrhage could also come from the ascending pharyngeal artery or the dilated veins in or beneath the tonsil. Compare "The Question of Hemorrhage after Tonsillotomy," by G. M. Lefferts, M.D., New York (*Arch. of Laryng.*, 1882, No. 1), and the discussion following the reading of this paper before the third annual meeting of the American Laryngological Society.—Moos.

Certain but slower is the diminution by the insertion of burners, for which I prefer my furrow burner. I draw into the tonsil two deep longitudinal furrows from above down, and follow it up with the spatula burner. Hemorrhages such as are feared by Hedinger during white heat of the burner I did not observe at any time, although I have performed the operation frequently. This method is best adapted for cases in which the capsule of the tonsil is adherent to the arch; it may then be drawn forward and small slices be removed from Matthieu's tonsillotome or the knife, while the burner can be easily used without any forward traction.

I can recommend this method of diminution, especially for the latter cases; usually the burning must be repeated several times, but here also it is necessary to wait two or three weeks with the next sitting, because a great deal disappears by atrophy.

I do not think it right to attack both sides in one sitting, as usually a pretty strong reaction occurs, often with dysphagia lasting for days; the latter can be much improved by syringing with ice-water combined with cold compresses on the corresponding external parts of the neck.

Finally I come to the *application of*

Galvano-cautery in the Ear.

For the removal of polypi, formerly Wilde's snare was generally employed; later, that of Blake. Both have the disadvantage that we have no proper fixed point in the thumb ring so that we cannot avoid a lever-like motion, which makes its greatest excursion at the long arm, the snare end, even when using an instrument well suited to the size of the thumb. Thereby the snare is easily displaced and unnecessary pain caused to the patient. In order to avoid this, I took Tobold's handle, which is constructed for laryngeal polypi, and placed upon it a plain silver tube, with its distal ends pressed flat,[1] into which the fine wire snare is inserted. Below, the handle is completely fixed and the finger is free to operate. With this snare I have operated on all soft aural polypi for about five years past.[1]

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[1] Compare different text-books.

For fibroid polypi I have had constructed a snare-holder the tubes of which, including insulation, measure but 2.8 *mm.* These are armed with fine platinum wire of 0.3 *mm.*, the snare is properly adjusted, and the operation is performed quickly and with very little pain by the galvano-cautery.[2]

For the removal of small polypoid proliferations I also use small burners bearing in front a plate ranging in diameter from 3 to 1.5 *mm.* For the cauterization of the smallest proliferations situated in perforations I use a platinum wire ending in a point. The afore-mentioned flat burners serve at the same time for making artificial perforations, with which I have not thus far, to be sure, secured any particular results as regards the remaining open. In but a single case I succeeded in keeping the perforation open (under observation nine months) after making the opening twice at the same spot and inserting a tubule of aluminium (Voltolini), whereby violent tinnitus has entirely disappeared and the hearing has been quite materially improved. Similarly as for this purpose, the employment of these burners and the traction handle commends itself also for those who precede the division of tensor tympani by a perforation[3] and for the removal of exudations in chronic and subacute cases,[4] because the procedure can be done more rapidly, bloodlessly, and with less pain than with other perforating instruments; and because exudations, especially if tenacious, can be removed more easily, both by aspirating instruments[5] and in other ways, through a round opening made of any size desired, than through a fissure, the size, direction, and patency of which cannot be produced with an equal certainty by the knife.

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[1] Gruber's handle, the description of which has been published but two years ago, is likewise very good for the purpose, only I believe—without being able to assert it positively—that my Tobold's wire snare can be directed with greater steadiness.

[2] To twist or tear off such polypi is unnecessary cruelty, and is even not quite free from danger.

[3] Hartmann justly recommended this, because the snare is more easily drawn into such tubes.

[4] I should not advise it for acute cases, because there I fear the radiant heat.

[5] Aspirators of Gruber, Schalle, Hartmann.

TWO CASES OF TINNITUS AURIUM CAUSED BY DISTURBANCES IN THE CURRENT OF CERVICAL BLOOD-VESSELS.

By R. C. BRANDEIS, of New York.

Case 1.—*Tin. aurium; spondylitis cervicalis. Both cured by application of jury-mast.*

Jas. T., aged 9 years, had long been troubled by persistent beating, pulsating noises in the left ear. This symptom was so strongly marked that the parents of the boy were rendered quite unhappy by his repeated and urgent appeals for relief.

The patient's appearance was wan and worn, his eyes heavy and dull, skin dry, tongue furred. He was unusually tall for his years, but at the same time very slight and delicately built. His mother informed me that some six months before his visit the boy had been thrown from his pony while riding and had fallen on his back, his head having struck heavily on the ground. There was no wound or discernible injury, but for some days later the patient had complained of pain in the nape of the neck, and intense headache in the occipital region. These symptoms were relieved by rest in bed and ice bags, which were regularly applied to the affected parts. Four days after the fall the boy was quite well again and returned to his school duties, but a week later he came home complaining of intense headache, which he referred to the upper cervical and sub-occipital region, and of a most distressing noise in the left temple. This latter symptom has persisted almost uninterruptedly, to the time of his visit. His sleep was restless and disturbed, appetite poor, and the movements of the bowels irregular. On examining his ears I found no sign of disease, the membranæ tympanorum being normal in color and contour. Hearing, as tested by watch and voice, was normal in both ears. Auscultation of the heart and the great vessels failed to give any signs of aneurysmal dilatation or other disease.

Some time previous to this I had a case of pulsating noises in the ear, due to aneurysmal dilatation of one of the arteries of the head, and I was therefore careful to search for a similar cause in this case. But the most careful examination resulted negatively. I was therefore unable to arrive at a positive diagnosis, and could not do otherwise than give an unfavorable prognosis. As the parents of the patient insisted that I should institute a course of treatment, I ordered a blister of cantharidal collodion to the cervical region, and the internal administration of twenty drops of hydrobromic acid (dilute) three to four times a day, my assumption being, that the tinnitus was due to labyrinthine congestion, probably caused by a dilatation of the left vertebral artery, suggested by the pains in the back of the neck.

The patient was told to apply the blister weekly for a month, to take his medicine regularly, and then report to me again.

Within a week marked cervical spondylitis involving the 2d, 3d, and 4th cervical vertebræ set in, which, besides presenting all the characteristic symptoms of the disease, was complicated by intense hemicrania and intolerable tinnitus aurium on the left side. The orthopædic surgeon applied a corset and jury-mast with chin support, and as soon as the head was lifted from the trunk, all head and ear symptoms disappeared spontaneously. The child wore the support for three weeks or more with marked relief; one night, however, the apparatus was removed, as he complained of pain in the back, and an hour later the tinnitus and headache returned with almost their original intensity. This condition lasted during the night, neither patient nor parents dreaming that there was any connection between these and the spinal caries. When, however, the brace was readjusted next morning all distress vanished. The child was now brought to me again, and after many interrogations I succeeded in eliciting the above-stated facts. Since that time, nearly three months ago, the boy has worn his support uninterruptedly, and none of the symptoms under consideration have ever manifested themselves. I learn from the attending surgeon that the spondylitis is rapidly disappearing and that the patient will be able to dispense with his brace within a month or two.

In a series of papers published in the London *Lancet*, 1878, and afterward collected in book form, entitled "Deaf ness, Giddiness, and Noises in the Head," Dr. Edward Woakes calls attention to the fact that the arterial supply of the perceptive portion of the auditory apparatus, or, in other words, of the labyrinth, is derived from the vertebral artery; the immediate supply coming from the arteria auditiva interna (Hyrtl).

If this artery is in any way interfered with, so as to change the free flow of blood to the labyrinth, it can readily be seen that the vascular supply of the internal ear must also be affected. Any lesion which tends to impair the natural tonus imparted to the vertebral artery by the vaso-motor nerves, which are derived from the inferior cervical ganglion of the sympathetic system, may cause a dilatation of its calibre and, *pari passu*, a congestion of the labyrinth. The increased quantity of blood now contained in the internal ear will press upon the intralabyrinthine fluid, and thus give rise to palpable noises. These are always synchronous with the diastole of the heart, and may be heard with great distinctness.

This condition of the vertebral artery can only be attributed to the shock and subsequent inflammation of the cervical vertebræ, particularly of their left half, caused by the injury which the patient received when he fell from his pony. The vertebral artery, after leaving the subclavian, passes upward and backward, and enters the foramen at the base of either the sixth or some higher cervical vertebra. It now passes vertically through the foramina in the transverse processes of the upper vertebræ until it reaches the axis; it then passes backward over the atlas, and, entering the cranial cavity through the foramen magnum, goes to make up the basilar artery.

The inflammation of the intervertebral discs and the probable affection of the transverse processes of the diseased vertebræ probably caused a paresis of the vaso-motor nerves controlling the vertebral artery, and the check having been removed, allowed an overwhelming quantity of blood to flow into the labyrinth.

The fact that the noise disappeared as soon as, and as long as, the supporting apparatus was applied and the diseased surfaces were separated, and only returned when they were allowed to come in contact again, seems to me pretty conclusive that the explanation which I have given is the correct one.

CASE 2.—*Tinnitus aurium and headache ; fibrous goitre ; cure by injections of tincture of iodine into goitre and internal administration of fluoric acid.*

Mrs. McF., aged 54 years, had long been afflicted with constant rushing noises in the right ear and corresponding side of the head. These noises, when they first began, some four years ago, had troubled her only occasionally ; but within the last eighteen months had increased steadily, so that, when she first consulted me, in December, 1881, the patient was almost distracted by the unceasing din in her ear.

Mrs. McF. is a large florid woman of apoplectic appearance, and was born in the county of Derbyshire, England. For several years past she has been affected with sexual troubles, owing to the gradual appearance of the menopause. I learned that she had been under the treatment of a succession of reputable physicians, who, in their endeavors to relieve the headaches and tinnitus aurium, had at one time or another treated her uterus, ovaries, heart, and liver, but without affording any decided relief. Careful examination of the ear failed to elicit any cause for the trouble, but casual inspection showed a decided dilatation of the veins of the left side of the neck, and of the temporal and posterior auricular region. When she coughed or attempted to blow her nose, I saw that the frontal and facial veins became unusually distended and varicose. I had not far to seek for a possible cause for this condition of things, for on baring her neck I discovered a large fibrous goitre, involving the right lobe of the thyroid gland.

This had existed for more than forty years, and was common to the larger number of the patient's family—who for many generations back had lived in a part of England where goitres are almost as commonly seen as in Switzerland or the Tyrol. Within the last three or four years, however, the tumor, which had formerly been quite soft, had hardened and diminished to its present size. On measuring the circumference of the neck carefully I found that, from the inferior thyroid incision around the neck to the spinous process of the sixth vertebra measured $11\frac{3}{8}$ inches on the right side, and only $9\frac{3}{4}$ inches on the left. That is, the enlargement due to the goitre was now $1\frac{5}{8}$ inches.

Thinking that the cause of the noises in the ear might be attributed to venous congestion, due to the pressure exerted by the hard tumor from below upon the anterior vessels of the neck, I proposed to treat the goitre by means of injections of tincture of iodine, as first proposed by Dr. Lücke, of Strasburg. Three hypodermic injections, made at intervals of one week, failed to have any effect. At this time I administered 10-drop doses of a one half (½%) per cent. solution of fluoric acid, and continued my injections weekly. A month later the circumference of the neck had been reduced to 20½ inches from 21⅛ inches, and at the same time the tinnitus had lessened considerably, and the headache had only manifested itself occasionally. I continued the hypodermic injections and the exhibition of fluoric acid, but after three months desisted from all further treatment. At that time the neck was 20 inches in diameter, and the tinnitus had almost entirely disappeared. There had been no headache for more than six weeks. The condition of the patient was most satisfactory, her appetite excellent, sleep undisturbed, and all the emunctories in proper order. In order to prevent any return of the goitre I advised the occasional inunction of the ointment of the red oxide of mercury.

The veins of the labyrinth, *i. e.*, the vena aquæductus cochleæ and the vena aquæductus vestibuli, both pass into the jugular vein, the former directly, the latter in part, inasmuch as it may pass into either the inferior petrosal sinus or into a vein of the dura mater. Any disturbance to the uninterrupted efflux of the venous blood may therefore be the immediate cause of a venous congestion of the labyrinth, and thus give rise to the rushing noises, which vary in intensity with the degree of obstruction.

In this case, however, the retardation was not limited to the ear, but as the obstructive agent pressed upon the jugular vein itself, the congestive symptoms extended to a great part of the region which is supplied by the ramifications of this vein. The headache, which was so prominent a symptom, was undoubtedly due to the congestion of the veins of the forehead, temple, and posterior auricular region, as well as the lateral and cavernous sinuses, all of which go to make up the vena jugularis.

Although parenchymatous injections of the tincture of iodine or other alcoholic solutions afford very satisfactory results in diminishing the bulk of goitrous tumors, I hardly think that I would have succeeded so rapidly in causing the tumor to disappear had I not also administered the solution of fluoric acid at the same time. This remedy was first employed by Dr. Edward Woakes, who acted upon the statement made by Prof. Virchow, that in those regions in which goitres prevail an absence of the fluorides can always be detected in the water drunk.

OTITIS MEDIA CATARRHALIS: OBJECTIVE SOUNDS (SPASMODIC CONTRACTION OF TUBAL MUSCLES?); NERVOUS ORIGIN; HYSTERIA.

By RICHARD C. BRANDEIS, M.D., of New York.

On February 1, 1881, Dr. R. O. Born, to whom I am also obliged for many of the details incorporated in this report, sent me Bianca B., aged 27 years, who was suffering from continuous, distressing noises in the left ear. For several years past the patient had been afflicted with daily recurrences of malarial fever which had greatly impaired her general health. I found marked hypertrophic pharyngeal catarrh of more than eight years' standing, which, of late, had rapidly grown worse, owing to repeated exacerbations. This trouble extended upward into the naso-pharynx, and examination, by means of the rhinoscope, showed that there was considerable thickening of the pharyngeal openings of both Eustachian tubes, and also some sluggishness of the tubal muscles. For about a week previous to examination there had been a considerable impairment of hearing in the left ear. Both mem. tymp. were sunken, left malleus considerably injected, and a large area in the posterior half of the drum-head depressed, which was probably a healed perforation. While making Valsalva's experiment the posterior fold bulged very much, but collapsed as soon as the inflation ceased; this was also the case when pneumatic traction was made.

For four or five days the patient had noticed an almost continued crackling sound, which was very like, but more intense than the noise made by rubbing the hair near the ear. She noticed four or five or more of these noises in rapid succession, then an interval of perhaps two or three seconds and a repetition of the crackling. This continued almost uninterruptedly, day and night;

an occasional cessation of a minute or two being the only respite the patient enjoyed. She has always been able to inflate her ear without closing nose or mouth, and whenever she did so she noticed a crackling before "the air passed out through her ear," as she expressed it. This had up to the last four years always relieved any temporary impairment of hearing, but since that time she has not been able to force air into her right ear. The result was that her hearing was greatly diminished on that side, but the changes in the weather had no apparent influence. Valsalva was successfully and easily done on the left side until a few days ago. Since then, however, considerable force must be applied in order to inflate that ear. There is a sensation of great fulness on that side, and H is greatly reduced. H left and right $=\frac{1/2}{36}$. *R* ear, whispering V 15′. *L* ear, loud V $\frac{20}{60}$.

I was able to hear the crackling noises complained of at a distance of about 20 feet from the patient, and if the sounds did not follow each other too rapidly I was able to count them.

A careful inspection, through the speculum, with the aid of a magnifying lens, of the *Mt*, its normal reflex, the handle of the malleus, and the reflex from the depressed portion, did not show any vibrations or movements whatever. The slightest touch of the walls of the auditory meatus with the speculum, or any other instrument, gave rise to a very distressing ear-cough, which, at times, endured for half an hour or more. This much I learned at the first and only examination of the patient. The following notes are copied from Dr. Born's case-book:

"*Feb. 3d.* Within the last two days the ticking has ceased, occasionally, for several hours at a time, during the forenoon. In the afternoon, it has always been more persistent than in the early part of the day. At present, I can only hear the crackling occasionally, and then not more than $\frac{1}{2}$–1 foot from the patient.

"*Feb. 7th.* After taking 20 grs. of quinine, the patient imagined she could hear better. Has now taken 40 grs.; tinnitus—V, *L E*, $\frac{15}{60}$′, h. $\frac{1/2}{36}$″; ticking less frequent and not so loud as before; patient is very irritable toward evening; hysterical. There is slight anæsthesia of the lower part of the left auricle, and also on the left side of the head when combing the hair.

"*Feb. 9th.* For several hours after the air-douche had been used, the air passed into the left ear, but the sound of the voice was not affected. There is less crackling, but hearing is diminished. V, *L E*, $\frac{8}{60}$, ; V, *R E*, $\frac{15}{60}$; h $\frac{1}{\infty}$ in either ear. There is now no improvement after Politzer; the tubes are open; very marked tinnitus; noises like the rattling of cars; the numbness is the same as at the last visit.

Feb. 24th. Patient has had bellows noises for several days past; these are rhythmical; autophony. Her face is flushed; there is a small perforation in the upper part of the left *Mt*; perforation whistle but no discharge.

March 18th. Clear mucous discharge; slight in quantity. Ordered a solution of zinci sulpho-carbol. for ear.

March 26th. No discharge; can inflate left ear by Valsalva's exp.; color of *Mtt* normal; h $\frac{2}{36}$ on both sides; V, *L E*, $\frac{15}{20}$ (whisper); V, *R E*, $\frac{15}{60}$.

At that time the crackling noises were still very marked, but owing to the disappearance of the patient no further history of the case can be given.

I think that the clinical history of this case proves pretty conclusively that the objective aural sounds were not due to contractions of any of the intrinsic muscles of the affected ear. The most careful inspection of the *Mt* failed to show the slightest movements, and the use of the air-douche, Eustachian catheter, and pneumatic speculum did not produce the least effect in changing either the intensity or frequency of the noises.

Although I did not succeed in detecting any movements of the tubal muscles, or any alteration of the normal function of the soft palate, aside from a slight impairment of mobility, I cannot account for the noises in any other manner than by attributing them to clonic spasms of the levator palati muscle. This is the more probable, as I discovered considerable congestion of the pharyngeal opening of the left tube. The nervous element of the case must also be considered; for the patient was markedly hysterical, and it is quite possible that the muscular spasm may have been due to this cause. Analogous instances are not wanting—we need look no farther than to the nervous spasms of the orbicular muscles of the eye to find, that in a hysterical patient constant, involuntary contractions of muscles may recur indefinitely without apparent cause.

REPORT OF THE PROGRESS OF OTOLOGY DURING THE SECOND HALF OF THE YEAR 1881.

Translated by Drs. W. C. AYRES and R. C. BRANDEIS, of New York.

I.—COMPARATIVE ANATOMY.

By H. STEINBRÜGGE, of HEIDELBERG.

(Translated by WILLIAM C. AYRES, M.D., New York.)

1. Prof. KUHN, Strassburg. Contribution to the anatomy of the ear. Part iii. The membranous labyrinth of reptiles. Bonn, 1882. *Archiv. f. microscp. Anat.*

2. URBAN PRITCHARD. The cochlea of the ornithorhynchus platypus compared with that of the ordinary mammals and of birds. (From the philosophical Transactions of the Royal Society, part ii, 1881.)

3. J. IBSEN, Prof. i Anat. (Died., 1862). Anatomiske Undersœgelser over Œrets Labyrinth. Afsluttet af Forfatteren i 1846. Nu redgivet paa Carlsbergsfondets Bekostning ved Dr. P. L. Panum, Prof. i Physiologi, Kjœbenhavn, 1881.

1. In his article on the labyrinth of reptiles, KUHN gives 7 plates and 73 figures. He describes minutely the inner ear of the chelonia. He describes also the ears of ophidia, sauria, and crocodiles, and shows that they differ but little from the tortoises.

He starts by giving the bones of the labyrinth of the chelonia as follows: the os proöticum and opisthoticum inclose the space for the labyrinth, as in the batrachia. It is limited anteriorly by the foramen trigemini; posteriorly, by the foramen jugulare, forming an irregular pyramid whose base is upward and whose apex is downward. The larger upper half contains the vestibule, semicircular canals, and ampullæ; the smaller lower half, the sacculus, the pars basilaris (the analogue of the cochlea), and the lagena. On the lateral side of the pyramid we find the oval foramen containing the foot-plate of the columella ; on the posterior, the foramen rotundum, whose occluding membrane is wanting ; on the median wall, the entrance for the ram. vestibuli and cochlearis. Above this is the apertura aquæduct. vestibuli, and the aqueduct enters between the round and oval windows. A delicate periosteum lines the space for the cochlea and the semi-circular canals, showing an epithelial covering with pigment cells, like in the corresponding tissue of the batrachia. The membranous labyrinth in the pars inferior is covered by a well-developed covering, composed of connective tissue with a few spindle-shaped cells. This is connected to the periosteum on the one side, and to the membranous labyrinth on the other, by bands of connective tissue. A section shows round or oval spaces which contain the perilymph. The space between the lateral wall and the membranous labyrinth is larger than that on the median side. It therefore happens that the membranous labyrinth is eccentric, and nearer the median wall. It stands upright within its bony case. The utriculus is a cylindrical tube running from in front backward ; its longest diameter is one *cm.* From its middle a tube goes upward (sinus utriculi), into the non-ampullary end of which the frontal and sagittal semicircular canals open. The sagittal and horizontal ampullæ connect with the anterior part of the utricular tube, while the posterior end of the latter goes over into the frontal ampulla. The non-ampullary branch of the horizontal semicircular canal opens into the posterior surface of the sinus tube, just over its origin from the corp. utriculi. The anterior end further contains a round vesicular organ, the recessus utriculi with the macula acustica, the floor of which is composed of spindle-cartilage, and the thin walls of the utriculus itself are made of connective and elastic tissues. The space for the utriculus connects directly with the sacculus by an elliptical opening (foramen utriculo-sacculare). Ampullæ and semicircular canals are composed of spindle-cartilage. In the tortoise the cristæ acusticæ are biscuit-shaped. The inner surface of the utriculus and its adnexa is covered with a layer of pavement epithelium ; in the neighborhood of the nerve epithelium this is transformed into cylindrical cells. In this way the plana semilunata stand on both sides of the crista. Since the crista is not on the bottom of the horizontal ampulla but on its wall, we find only one planum semilunatum. We find tall, transparent cylindrical cells, as the so-called roof-cells of the raphe ; they form a light stripe, which is continued on to the inner wall of the semicircular canal. The sacculus, which lies below the utriculus and above and in front of the pars basilaris, is a large, flat double organ whose lateral and medial halves only touch each other below, the utriculus projecting between them from above. The medial portion (cartilage in its inferior part) can be called its floor, the lateral (membranous) its roof. The former passes backward into the anterior part of cartilage of the pars basilaris, and contains the opening of the ductus endolymphaticus (aquæd. vestibuli) in its superior half ; in its inferior, the recessus sacculi, which contains the macula.

The lateral half, composed of connective tissue with a basilar membrane and a pavement epithelium, contains an opening into the cochlea, whose cylindrical cavity, the scala cochlearis, is perpendicular, and limited by membranous walls (memb. basilaris and Reissneri). The cartilaginous side exhibits an oval space whose anterior half is concave, the concavity being an analogue of the sulcus spiralis of mammals. There is a lateral and a medial projection, to the former of which the membrane of Reissner, to the latter the basilar membrane, is attached. The former projection is similar to the triangular cartilage of birds, or to the ligamentum spirale of mammals. The anterior half is also termed nerve cartilage, since the n. cochlearis enters through it. The space which is exterior to Reissner's membrane may be called scala vestibuli, that interior to the basilar membrane the scala tympani. Reissner's membrane can be considered a continuation of the membranous (lateral) sacculus-shell, and has a tall cylindrical epithelium on its inner surface. The memb. basilaris is finely striated, and shows round cells with large nuclei on its outer side ; has a basilar membrane with the macula acustica basilaris on its anterior third, and a cylindrical epithelium on its posterior division. The cavity of the pars basilaris is continuous anteriorly into the lagena, the latter being likewise a continuation of cartilaginous enclosure. On its inner surface it is covered with a fine reticular network, and has an epithelium which is continuous with that of Reissner's membrane. In the beginning the cells are low, but toward the neuro-epithelium of the crista lagenæ they are taller.

Before its entrance into the bone the acoustic nerve divides into the ram. vestibuli and ram. cochlearis. The former supplies the macula in the recessus utriculi, and also the cristæ of the sagittal and horizontal ampullæ. The latter sends a branch to the macula sacculi, the pars basilaris, the lagena, and crista of the frontal ampulla. A fine branch goes to the nerve papilla on the inner surface of the utriculus, in the vicinity of the mouth of the frontal ampulla (described by Retzius[1] as ramulus neglectus in reptiles).

The nature of the nerve epithelium and the terminal nerve fibres is made much clearer, for the finer histological structure of the macula of the sacculi, the cristæ of the ampullæ, the crista acoustica of the pars basilaris, the lagena, and papilla Retzii is everywhere the same, and very similar to the analogous parts in the ears of the teleosts and the amphibia. On the basilar side of the cartilage, we find a single row of small round cells, without a cell-membrane, the so-called basilar cells, between which is a granular amorphous mass. Then comes the layer of cylindrical cells, whose lower parts show with osmic acid a nucleus and nucleolus. The inferior ends of these cells are sometimes conical, often sharp-pointed, and occasionally thread-like. A reticular edge forms the upper margin which is passed only by the acoustic hair-cell formations, the size and physiological significance of which have not yet been precisely determined. At any rate they have nothing to do with the nerve terminations. The nerves lose their medullary sheaths after having penetrated the basilar border. The axis-cylinders then pass to the inferior ends of the cylindrical cells, without entering them ; or by crossing each other they form a plexus, from which the terminal fibres start, and pass between the cylindrical cells up to the free surface of the nerve epithelium. On the cristæ of the ampullæ we find the finely striated enigmatical structure of the cupula terminalis shaped like an admiral's hat. On the nerve epithelium of the utriculus, the sacculus, and the lagena are otoliths of soft chalk surrounded by membranes. Kuhn was not able to find otoliths in the pars basilaris, but its nerve epithelium is covered by the membrana Corti. The crista acustica lagenæ lies on the medial surface of the wall of the lagena, in the shape of a half moon.

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[1] Retzius first found this papilla in the fishes and called it papilla basilaris. Kuhn shows further that the pars initialis cochleæ in reptiles is a further development of this papilla. Since both of these authors found this nerve in the higher reptiles in the utriculus, and not in the cochlea, although it belongs to the ram. cochlearis, it cannot be a part of the cochlea. Kuhn therefore proposes to drop the terms "papilla basilaris," and "ramus neglectus," and proposes the term "papilla Retzii" for the ending of this nerve.

Then follow examinations of the labyrinth of the tropidonotus natrix from the genus ophidia. We will restrict ourselves to the principal points in the labyrinth of the tortoise. The connective tissue is wanting in the vicinity of the membranous labyrinth, the perilymph being inclosed in a free space. As in the batrachia the lagena is larger than the pars basilaris. Reissner's membrane, which is a continuation of the roof of the sacculus, does not insert itself into the anterior cartilage of the pars basilaris, but passes over it. The cristæ of the sagittal and frontal ampullæ (not the horizontal) have a short transverse ridge in the middle of the longitudinal ridge, by which a crucial figure is formed called septum cruciatum. The crista lagenæ is very long, and shaped like a horse-shoe. Among the saurians the author examined the lacerta muralis and l. agilis : in them also the connective tissue in the perilymphatic space is wanting. The sinus utriculi is longer, the sacculus larger than in the ophidia. The lagena is much larger than the pars basilaris. The oval space of the latter and also the membrana basilaris are divided into two halves by a strip of cartilage running through their middles. The n. partis basilaris is therefore divided into two branches. The double-contoured nerve fibres enter the nerve epithelium with their medullary sheath, and connect with the under end of the cylindrical cells. No plexus (same as by the teleosts).

Then follows a description of the inner ear of the alligator lucius from genus hydrosauria. There is an outer, middle, and innner ear (transition stage to the birds). The bony case of the cochlea is bent backward ; also in the interior there is a spiral bending whose convexity is turned frontward. There is a depression on the medial surface of the pyramid for the meat. aud. int. The scala vestibuli and scala tymp. communicate at the apex of the cochlea, where the membranous lagena does not completely fill the bone cavity.

There is no connective tissue in the perilymphatic space. The labyrinth is generally more voluminous ; its tissue is tough and more cartilaginous. The sacculus passes over the canalis reuniens at its posterior inferior end, which unites with Reissner's membrane and leads into the scala cochleæ. On account of the spiral twisting the nerve cartilage is behind, and the triangle (corresponding to the spiral ligament) in front. The lagena is composed entirely of cartilage. The papilla Retzii is pushed into the vicinity of the frontal ampulla.

2. The cochlea of the ornithorhynchus platypus is of special interest, since it belongs to a class which forms the link between birds and mammals. PRITCHARD'S examination shows the peculiar condition, that in its grosser structure the cochlea approaches that of birds, whereas in its finer structure it is similar to the mammals. The axis of the short cochlear tube is still vertical, in contradistinction to the horizontal cochlea of mammals, and terminates in the lagena; it has a lateral dilatation and bends outward. It differs in this respect from the cochlea of birds, which bends inward. Scala vestibuli and scala tympani communicate by a helicotrema, and are lined with an epithelium on the inner side. The former is much the larger in size. The ductus cochlearis extends into the lagena and ends in a blind sac after having made a convolution of 270°. Its superior end ought to communicate with the sacculus, but the author was unable to demonstrate a connection. As to its histological structure, it is almost identical with that of mammals. The rods of Corti are very steep; instead of one vas spirale, it has two; and also Reissner's membrane is rich in vessels which form well-marked glomeruli. There is no great difference in the inner and outer hair-cells and in the nerves, from those of mammals. The walls of the lagena are composed of thick connective tissue and are covered with a cuboid epithelium on the inner side. At the end of the duct. cochlearis, the same nerve epithelium shows itself as in the macula sacculi (basilar layer, small round cells, above which hair- and bristle-cells, covered by a cuticular membrane). The whole is covered by a mucoid mass, which in the fresh condition probably contains the otoliths. Bundles of the acoustic nerve enter here and end in the epithelium. The author hardened the labyrinth in chromic acid and decalcified it with a ¾% solution of hydrochloric acid.

3. Concerning IBSEN'S publications, Prof. Moos received the following note from Victor Bremer: "This book has had a remarkable fate. It was written 35 years ago, and appeared some 20 years after the death of the author. It was presented to the Scientific Society of Copenhagen in 1846, with the idea of having it placed in the archives of the society. The society acknowledged its reception, but wished a rearrangement for publication; on account of which the illustrious anatomist, Ibsen, was offended, and did not wish it published at all. It comprises very fine comparative anatomical examinations of the cochlea, especially of fishes and

reptiles, and is still of material value, especially to anatomists. The Carlsberg-Fond in Copenhagen has had it beautifully printed, under the direction of Prof. Panum, presenting it as a memorial of its illustrious author."

The reviewer can only corroborate these statements, viz. : that the book is of great value to those who are interested in comparative anatomy of the cochlea, notwithstanding the fact that since we know the finer histological structure from Corti, and have made such progress in microscopical technique that examinations of the cochlea which were made so long ago would not suffice to-day. So much the more praiseworthy is his work, since he had made some of the most difficult examinations without our technical devices, and prepared specimens which Eschricht still describes as the "gems" of the Copenhagen museum. The reproduction of these in the book are very fine, and as far as the grosser anatomy, semicircular canals, and sacculus are concerned, answer all purposes. It is, however, more difficult to reconcile Ibsen's method of classifying the cochlea of the vertebrates into three groups to our more extended knowledge on this subject. In fact we can almost believe that it was this classification which made the committee wish a revision of the original. In the membranous labyrinth, the author distinguishes besides the semicircular canals, the alveus, and the utriculus, a large and a small stone sac (saccus and sacculus lapilli), so called on account of their containing the otoliths. He distinguishes three principal groups by the relative position of these sacs : In the first group the small sac lies beneath the larger, and communicates with it by an opening, or with it forms one organ. This group comprises specimens from the petromyzons up to the birds inclusive. In the birds the smaller sac corresponds to the lagena. In the second group, the small sac lies behind the larger and communicates with it at first ; later they separate, and the former lies under the alveus, which position it also has in the third group, where it corresponds to the vestibular sac, or what we now call the sacculus. The larger sac develops itself from a simple vesicle to an oval sac, which is divided by a membrane containing nerves. In the second group the perennibranchiata (for instance the siredon Mexicanus) are the lowest type, the teleosts the highest. The monotremes (echidna hystrix and ornithorhynchus) form an intermediate group. The third group comprises the mammalia, in which the larger sac is transformed into the cochlea. The lamina spiralis (accessoria) of the cochlea is considered analogous to the otolith contained in the large sac, and is named concholith, since Ibsen found it of chalky hardness and containing numerous otoliths. As to the details of the extensive examinations (commencing with specimens of only one semicircular canal with two ampullæ, and containing examples from all varieties of vertebrates) we must refer to the original ; the reviewer would call attention to a few points which testify to Ibsen's peculiar and independent mode of investigation. He first demonstrated that the membranous semicircular canals are not situated in the central axis of the bony canals, and are not surrounded by the perilymph, but that they are attached to the concave edge of the bony canals. The aqueduct of the cochlea served for the entrance of a blood-vessel. In the whale and seal it also contains a twig of the n. vagus. The aquæductus vestibuli commenced in the large sac or the cochlea, and in the embryo of man has a high development, but is atrophied later ; it corresponds in the plagiostomes to a duct which starts in the stone sac and leads to the outer surface of the head. In nine deaf-mutes, besides anomalies in the cochlea, Ibsen found the aquæductus vestibuli unusually large, and considered the condition a fault in development. Besides he described a funnel-shaped prolongation of the utriculus, which in fœtal life perforates the bone at the posterior edge of the oval window, forming a communication between the utriculus and the drum-cavity. He found this continuation in mammals, also in 4-9 month human embryos, and reports a few cases in which he observed the outer opening in the drum-cavity, and that he passed a human hair through it. The reviewer found in an adult a strongly developed ligament at the position described by Ibsen, which attached the utriculus to the outer wall of the vestibule. Finally, we will remark that the "alveus" of many of Ibsen's drawings of the labyrinth of animals corresponds to what is now called the "sinus utriculi" ; and that part which he describes as utriculus, is now called the recessus utriculi.

II.—PATHOLOGY AND THERAPEUTICS.

By A. HARTMANN, of Berlin.

Translated by William C. Ayres, of New York.

GENERAL.

1. Bezold. Fourth Report of his private Eye and Ear Infirmary in Munich. *Baier ärztl. Intelligenzblatt*, No. 26, 1881.

2. Habermann. Report of the K. K. University aural clinic of Prof. Zaufal, for the year 1880. *Arch. f. Ohrenheilk.*, vol. xviii, p. 69.

3. Weil, Stuttgart. Preliminary communication of the results of the examination of the ears of 4,500 school children.

4. Rossi, Prof. E. de. X. Anno di Insegnamento della Otojatria, etc. Rome, 1881.

5. J. Gottstein and R. Kayser, Breslau. The diminution of hearing in locksmiths and blacksmiths. *Bresl. ärztl. Zeitschr.*, No. 18, 1881.

6. Prof. Moos, Heidelberg, H. Pollnow and D. Schwabach, Berlin. Disturbances of hearing of locomotive engineers, and their influence on safe management of railroads. Reprints from these Archives. Wiesbaden, 1882.

7. Jacoby. Bad hearing of engine-drivers. *Breslau. Archiv f Ohrenheilk.*, vol. xvii, p. 258.

8. G. Brunner, Zurich. Smaller communications. These Archives, vol. x, p. 244.

9. W. Kirchner, Würzburg. On the influence of quinine and salicylic acid on the ear. Report of the Wurzburger phys-med. Gesellsch., 1881, and *Berl. klin. Wochenschr.*, No. 49, 1880.

10. Franz Tuczek. A case of objective noises in the ear, caused by melancholia. *Berlin. klin. Wochenschr.*, No. 30, 1881.

11. Joseph Herzog, Graz. A case of noises in the ear, caused by an aneurismal enlargement in the region of the left post. auricular artery. *Mon. f. Ohrenheilk.*, No. 8–9, 1881.

12. Weil, Stuttgart. Contribution to the knowledge of the origin of tinnitus. *Mon. f. Ohrenheilk.*, No. 11, 1881.

13. Ladreit de Lacharrière. Du bourdonnement. *Annales des Mal. de l' Or.*, No. 6, 1881.

14. Prof. Moos, Heidelberg. Double hearing as a result of iodide of potassium. These Archives, vol. xi, p. 27.

15. H. Steinbrügge, Heidelberg. A case of diplacusis. These Archives, vol. xi, No. 1, page 15.

16. Glauert, Berlin. A case of double hearing. *Berliner klin. Wochenschr.*, No. 48, 1881.

17. Robert Cooper. The wisdom teeth and deafness. *Dublin Journ. of Med. Science*, Sept., 1881.

18. Maurice Raynaud. De l' otite diabétique. *Ann. des Mal. de l' Or.*, 1881, p. 63.

19. Charles E. Hackley, New York. Inhalations of chloroform as a cause of ear-disease. These Archives, vol. x, p. 202.

20. M. Ouspensky, Moskow. Surdité compliquée, etc. *Ann. des Mal. de l' Oreille*, 1881, p. 373.

21. Prof. Zaufal. The importance of examining the fundus of the eye in the diagnosis, prognosis, and treatment of ear-diseases. *Prag. med. Wochenschr.*, No. 45, 1881.

22. Young. On the bad effect of alum gargles on the teeth. These Archives, vol. x, p. 115.

23. Gellé, Société de Biologie. The accommodation of the ear. *Le Progrès Médical*, No. 43, 1881.

24. Schwabach. The methods of testing the hearing. *Eulenberg's Real-Encyclopädie*, vol. vi, p. 567.

25. Schwabach. Ear-trumpets. *Ibidem*, p. 574.

26. Barotoux, Paris. L' audiphone de Rhodes, etc. *Ann. des Mal. de l' Or.*, 1881, p. 95

27. Eduard Fournié. Nouvelles recherches sur le fonctionnement de la tube d' Eustache, etc. *Revue Méd.*, No. 38, 1881.

28. F. M. Wilson, Bridgeport. Three aural conveniences. These Archives, vol. x, p. 204.

29. J. P. Worrel, Terre-Haute. A new device for holding the otoscope and laryngoscope. *Am. Journ. of Ot.*, vol. iii, p. 280.

30. G. Czarda. New instrument for the treatment of diseases of the nose, larynx, and ear. *Prag. Illustr. Vierteljahrsschr. der ärzl. Polytechnik.*, 1881.

31. Chr. Schmelck. Nogle Bemerkinger om Oeret og dets Plege, etc. Christiania, 1881.

32. Arthur Hartmann, Berlin. Deaf-mutism and the education of deaf-mutes by lip-reading and articulation. With numerous and important additions written by him expressly for this work, etc. Translated by J. Patterson Cassels. London, 1881.

33. Compte rendu du congrès internat. pour l' amélioration du sort des sourds-muets, tenu à Milan du 6–11 Sept., 1880. Rom., 1881.

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1. Bezold's report covers a space of three years, 1878–80. During this time 1,759 ear-patients were treated. He divides his patients according to their age. Adults, 1,407 ; children up to puberty, 352. Simple catarrh of the tube was very frequent in the children, while only 7 per cent. of this class suffered from chronic middle-ear catarrh. He also makes a distinction between one-sided and bilateral affections. The chronic non-suppurative

diseases occur in the majority of cases on both sides, while all acute diseases were in the majority on one side. According to B. furuncles only occur in the cartilaginous portion of the external canal. A diffuse idiopathic inflammation of the external canal with secretion of pus from the surface, has no right of existence in the pathology of the ear. All ear-operations, even puncture of the drum-membrane, B. does under antiseptic precautions. The canal is syringed with a 2-per-cent. solution of carbolic acid, and the instruments washed with a 5-per-cent. solution of the same, and afterward the canal is filled with boracic acid. Bezold agrees with Löwenberg that in treating acute diseases of the middle ear with boracic acid, an artificial enlargement of the perforation of the drum-membrane is often necessary. Small polypoid growths form in some cases. A secondary otitis externa is never observed.

2. HABERMANN gives a report of Zaufal's clinic for 1880. There were 1,149 patients, 698 men, and 451 women. Of these 254 came only once. Of those treated 476 were cured ; 213 improved ; 61 not cured ; result unknown in 94 ; died, 3 ; transferred to other departments, 15 ; and 33 still remained under treatment. The report includes a table of cases, table of operations, and the histories of many cases.

3. WEIL examined 4,500 school children, boys and girls from 7–14 years old. His preliminary communication shows : 1, that the normal ear must hear the whisper at 20–25 metres ; 2, defects of hearing are very common ; in the schools 30 per cent. of the children heard badly with one or both ears ; 3, the children of well-situated families gave better results than those whose situation was bad, in one private school, for instance, there were only 10 per cent. who heard badly ; 4, the percentage of bad ears increases with the age; 5, the country schools gave a relatively good result. (See the author's elaborate paper in the previous number of these ARCHIVES. K.)

4. As in past years, ROSSI gives a complete report of the cases which have come under his treatment. There were 526 in all, 293 men, 139 women, and 94 children. Twenty-seven cases were received in the hospital clinic. Rossi discards Wilde's incision in acute affections of the mastoid process, since, according to his experience, such effects subside under warm irrigations of carbolic acid, and the use of blue ointment and the extract of belladonna. He uses warm cataplasms very frequently. We must refer to the

original for the histories of many interesting cases of caries of the mastoid process with the formation of sequestra.

5. GOTTSTEIN and KAYSER report the results of an examination on the influence that the business of locksmiths and blacksmiths have on their ears. A comparison is also made between these and other workmen whose ears are not affected by their occupation. The results are tabulated, and are as follows: lock- and blacksmiths incur a gradually increasing diminution of hearing from their business. It is caused by the accompanying noises, and is most probably the result of an affection of the acoustic nerve from over-irritation by sound and concussion.

6. This brochure contains about the same as has already been published in these ARCHIVES.

7. JACOBY held the position of surgeon to a railroad for 10½ years, and examined eighty engine-drivers, twenty of whom he had had under treatment. Five of these had one-side affections of the labyrinth, and in the others acute or chronic anomalies of the middle ear. In two who had served a long time, there was no diminution of hearing. He further mentions the opinion of many railway surgeons, that only a few persons working on locomotives need be discharged from service. He adds that, according to his observations, a diminution of hearing need not occur, contrary to the extensive and laborious examinations of Schwabach, Pollnow, and Hedinger.

9. KIRCHNER reports the results of his investigations made in the Pharmacological Institute at Würzburg, on the effects of quinine and salicylic acid on the ears of different animals. Larger animals were given 1–3 *grm.* by a stomach-pump, and afterward fed for several days. *Post-mortem* examination showed hyperæmia and hemorrhages in the tympanic cavity; also in the labyrinth, numerous hyperæmic conditions and reddish coloring of the endo- and perilymph. In a second publication he tries to bring the results of his experiments in accord with clinical observations. The case was that of a pathological change in the ear after quinine or salicylic acid, probably a vaso-motor disturbance, in which there was not only a temporary hyperæmia but a paralysis of the blood-vessels, with stasis and exudation in the various tissues of the ear. Antiphlogistic remedies were used, such as blood-letting, mercurial ointment, iodine; in chronic swelling, a solution of salt and sal ammoniæ, iodide of potash, or nitrate of silver. In troublesome tinnitus with diminished bone-conduction good results were obtained from the constant current of electricity.

10. TUCZEK reports an interesting case of a patient who was admitted to the clinic in Würzburg on account of melancholia which had occurred simultaneously with noises in the head and ears. She said that she constantly heard something like the ticking of a watch, and attributed her sadness to this noise. When close to the ear of the patient a crepitant noise could be heard at 20 *cm.* It occurred rythmically precisely twice as frequent as the beat of the pulse. When the mouth was open it could be heard at 12 *cm.* The carotid pulse was felt with every second undulation over the vena jugularis externa, and in the maxillary region. Hearing was perfect on both sides, drum-membranes normal; no effect after galvanization. It was accidentally discovered that the noise ceased when the speculum was pressed against the posterior wall of the external canal. The canal was accordingly tamponed, yet the noise continued, but ceased after the tampon was removed. With the cessation of the noise, her melancholia also passed off, after a short time. In trying to explain the case Tuczek suggests that the synchronism of the noise with the venous undulation is important.

11. HERZOG reports minutely the case of a 76 year-old woman who had very loud hammering noises in her ear. On the same side (left) a spot as large as a ten-cent piece appeared on the mastoid process, which was soft and red. Pulsation could be felt, and a blowing noise could be heard in it with the stethoscope which was isochronic both with the heart-beat and the noise of which the patient complained. A swelling also occurred later in the carotid. Besides these there were palpitations of the heart, dyspnœa, congestion, and temporary convulsions in the left extremities, and hyperæsthesia in the corresponding side of the head, which Herzog described as reflex symptoms. The noise disappeared completely on compression of the aneurismal spot on the mastoid and the carotid, and the hearing was at the same time improved. H. considers the hammering noise as a bone-conduction of the blood-sound in the aneurism of the post. auric. artery.

12. WEIL comes back to his old observation, that noises in the ears can be influenced by blowing air against the wall of the ear. Since he has already declared this result as an effect of reflex irritation of the vaso-motor nerves, he now writes: "All noises that can be stopped by inflations are blood-noises." He seeks to prove the correctness of this by citing many examples. Local irritations of the canal, as, for instance, touching it with a

cold probe, can not affect the acoustic nerve. That the sympathetic is really excited he infers from his observation of the dilation of the pupil after the inflation. Many diseased processes are then referred to in which the cessation of the noises follows, or does not follow.

13. LADREIT DE LACHARRIÈRE distinguishes three kinds of noises: 1. Those which come from closure of the outer-canal or the Eustachian tube. 2. From compression of the middle ear, caused by pressure on the hammer in swelling of the mucous membrane. In all cases the pressure is transmitted to the labyrinth by the stirrup. 3. Labyrinth noises caused by labyrinthine affections.

16. GLAUERT reports a case of double hearing caused by an acute exudative middle-ear inflammation. The patient heard two sounds in the diseased ear, one of which seemed to be an echo in the ear of the original sound. Testing with the piano, all tones from "D" up were heard double. It disappeared when the disease was cured. G. thinks that the position of double hearing was in the labyrinth.

17. COOPER tries to show that there is a very obstinate form of chronic otitis with diminution of hearing, which is caused by slow or abnormal cutting of the wisdom teeth. He gives five cases, and one of them at least seems to prove the correctness of his opinion.

18. RAYNAUD is convinced that otitis diabetica happens more frequently than is believed, and that this otitis, like anthrax, diffuse phlegmon, or genital-erythema, can be considered as the result of the diabetes. He bases his opinion on the observation of one case. In a person with pronounced diabetes and dropsy, sudden pain occurred in the ear, and during the night there was profuse hemorrhage; later there was a bloody serous running which contained no sugar. There was a small perforation of the drum-membrane. *Post-mortem* examination showed middle-ear inflammation, with ostitis of the mastoid cells. R. thinks that the latter is very important, and says that nothing can be more natural than to connect the otitis with the diabetes.

20. OUSPENSKY reports two cases of hysterical deafness. One was a young lady of 19, who had lost both drum-membranes from scarlet fever, and was completely deaf. Besides the deafness there were loss of smell and taste, paralysis of the palate and one side of the face, also defective vision, and anæsthesia on one half of the

head. The hearing came back, but disappeared again suddenly. On account of the nervous character of the deafness O. galvanized the sympathetic in the neck. The deafness disappeared suddenly, and after six applications did not return. In the second case the patient had been deaf on one side, and had had troublesome noises for five years. The auricle and external canal were insensible. She lost her hearing suddenly, after sneezing. In this case also, all the symptoms disappeared after galvanizing the sympathetic in the neck.

21. Zaufal gives the results of his experiments under the following heads :

1. Ophthalmoscopic examinations are an integral part in the examination of the ear, in diseases of the drum-cavity, both in the acute and chronic otitis med. suppurativa in whatever stage they come under treatment.

2. In cases where the examination of the sound-conducting apparatus gives a negative result, in difficulty of hearing or deafness, subjective noises, vertigo, etc. (also after traumata), the ophthalmoscopic condition is of great importance in the diagnosis of labyrinth or intercranial affections, or a combination of both. (Knapp's suggestion of the necesity of an ophthalmoscopic examination in cases of so-called nervous deafness.)

3. In determining the indications of trepanation of the mast. process, an ophthalmoscopic examination is invaluable. It can show us an extension of the inflammation of the drum-cavity into the brain (meningitis, thrombosis of the sinus, etc.) at a time when the subjective symptoms are not yet pronounced. When the meningeal symptoms are increasing we notice also an increase of the ocular symptoms, and when they diminish the ocular symptoms diminish likewise, (Albutt, Kipp, Zaufal).

4. The influence which trepanation has on the brain process is most easily observed in the changes in the optic nerve and retina.

5. Changes in the background of the eye generally occur, in the passing over of an inflammation of the drum-cavity to the brain, first in the eye on the same side as the ear-disease. Generally both eyes are affected, and it may happen that the opposite eye is the more so.

6. After the trepanation the improvement in the eye is more marked, first on the side of the affected ear. The eye on the other side is also preceptibly improved.

In all of Zaufal's cases where otitis med. supp. led to meningitis or sinus thrombosis there were well-marked changes in the background of the eyes. In order to show the value of an ophthalmoscopic examination, he gives the history of a case very minutely.

23. The instrument which GELLÉ uses to measure the accommodation of the ear consists in a soft tube which is put into the ear air-tight, the other end being attached to an india-rubber bag. If a tuning-fork is struck and placed on the tube, and the rubber bag compressed, the degree in which the tone of the tuning-fork is heard in different amounts of pressure of the bag lets us form a conclusion as to this function of the ear. Whether Gellé has used the instrument practically or not is not mentioned in his report.

24. SCHWABACH treats of the examination of the ear, in a short but exhaustive manner, *Eulenberg's Real-Encyclopädie.*

25. The same author has written an article on ear-trumpets in the same work. The useful instruments for this purpose are there described.

26. In the deaf-mute institute in Paris some new experiments were made with the audiphone in the presence of Rhodes, its discoverer. They showed that no improvement was obtained with it in the perception of speech. Musical sounds seemed to have been more confused by it.

27. In his earlier experiments FOURNIÉ came to the conclusion that the Eustachian tube was open in the state of muscular rest. The manner of proving this is somewhat peculiar. He took two glass balls, which were attached by a glass rod 2 *mm.* thick. In one of the balls there is gas ; the other is closed. Since he could not smell that gas was in the first ball he considered it as proven that by open tubes no air went into the drum-cavity. It must therefore be driven into it by the action of the muscles. Later anatomical considerations have convinced him that the tubes are widest opened at the beginning of the act of deglutition, brought about by the action of the tensor veli and the m. glosso-palatinus. In the latter part of this act the tubes are compressed by the tensor tubæ, and the air contained in them forced into the drum-cavities.

How erroneous the conclusions are which Fournié draws from his alleged physiological facts, is evidenced by his discussion of the usual methods of inflation. According to Fournié Toynbee's experiment does not produce a rarefaction but a condensation of air in the drum-cavity. A simple inspection of the drum-head during this experiment would have convinced him of the contrary. In Politzer's experiment the forcing of air into the tubes is of but little moment. In Lucæ's or Gruber's procedure the passage of air through the tubes, according to Fournié, is impossible, as the tubes are closed. The best procedure is now found : "The procedure of Edward Fournié." Open the mouth before a looking-glass, depress and contract the velum palati, until above and before the anterior arches two small dimples are formed ; in that moment the tubes are opened and the air enters the drum-cavity by itself.

29. Worrel recommends to fasten the forehead mirror by a semicircular steel spring, passing antero-posteriorly over the head.

30. Czarda's new instruments are : A long parallel mirror for the pharyngo-nasal cavity ; a modified hard-rubber atomizer with interruption valve ; a new fountain syringe for ear and nose ; a slop-bowl for ear and nose ; a set of rhino-surgical instruments.

31. A popular little book for ear-patients.

32. In the English translation of Hartmann's treatise on deaf-mutism the statistics of Wilhelmi (see these Archives, vol. x.) are added.

(The remaining part of this report is translated by Dr. R. C. Brandeis.)

EXTERNAL EAR.

34. W. H. Robb. A case of microtia. *Amer. Jour. of Otol.*, vol. iii, page 228.

35. H. Knapp. Bilateral rudimentary auricle, with absence of the external auditory canal. These Archives, vol. x, page 119.

36. Clarence J. Blake. Treatment of othæmatoma. *Am. Jour. of Otol.*, vol. iii, page 193.

37. H. Knapp. The nitrate of silver treatment of eczema of the ear. These Archives, vol. ix, page 346.

38. M. Buch, Helsingfors. Fibromata due to the wearing of ear-rings. *St. Petersburg Med. Weekly*, No. 31, 1881.

39. Ed. Ely. An operation for prominence of the auricles: These Archives, vol. x, page 97.

40. E. Ménière. The mastoid region, considered in its relation to disease of the external meatus, without any affection of the middle ear. *Gazette des Hôpitaux*, No. 86, 1881.

41. August Lucae. On the importance and operative removal of exostoses of the external meatus. *Arch. f. Ohrenheilk.*, vol. xvii, page 266.

42. F. Graf, Frankfort on-the-Main. On the nature of desquamative inflammation of the external meatus. *Mon. f. Ohrenheilk.*, No. 12, 1881.

43. E. Zaufal. Report on the foreign bodies observed in the meatus and tympanic cavity at the Aural Clinic at Prague. *Prag. Med. Wochenschr.*, No. 35, 1881.

44. Moldenhauer. Removal of a foreign body from the auditory meatus, with partial detachment of the auricle. *Arch. f. Ohrenh.*, vol. xviii, page 59.

45. Thomas Barr, Glasgow. Foreign bodies in the ear. *Glasgow Med. Journ.*, No. 6, 1881.

46. E. D. Speir. A new and simple proceeding for the removal of foreign bodies from the ear. *Amer. Jour. of Otol.*, vol. iii, page 197.

47. F. Bezold, Munich. Scald of the membrana tympani. *Arch. für Ohrenh.*, vol. xviii, page 49.

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34. Robb reports a case in which there was malformation of both auricles. On neither side was there a trace of any depression which might correspond to the auditory canal. The whispering voice was heard at 6 feet distance, and ordinary conversation as far as 15 feet.

36. In two of the cases of othæmatoma described by Blake, the exudation was located on the left side ; no psychical disturbances were discoverable. In these cases the fluid was evacuated through an incision made into the tumor, and continuous pressure was applied by means of small sponges and an elastic bandage. Massage was not employed before the exudation had disappeared. In both cases a perfect cure was attained. Blake advises caution in the use of massage ; it should only be resorted to when pressure has succeeded in restoring the ear to its normal shape.

38. In Buch's case, a woman of 19 years, two tumors, varying in size from a hazel-nut to a pea, and due to the irritation caused by the wearing of ear-rings, were found on the lobules of both ears. They had formed in the course of a year. The tumors occupied the entire substance of the lobule and were confluent. Microscopic examination determined that they were of a fibromatous nature.

40. Of nine cases of affections of the mastoid process due to inflammation of the external meatus, Ménière reports three in detail. In every instance in which this complication arose, the original seat of the disease was located in the posterior and upper

part of the canal, where the fibro-cartilaginous portion is joined to the bony portion. The treatment employed is antiphlogistic ; if this does not suffice, Wilde's incision must be made. (Ménière's experiences supplement those previously made by *Hagen.* REVIEWER.)

41. In the first of LUCAE's cases of exostosis of the auditory canal, a sponge tent had been forced into the passage, a piece of which had become detached and was left behind the isthmus. Otitis media acuta purulenta, extending to the mastoid process, causing caries, set in. The sponge tent was removed with forceps, and the mastoid perforated by means of a probe. All the alarming symptoms now disappeared. In three cases Lucae removed the exostosis by means of chisel and hammer. In all of these the exostosis extended further into the meatus than was first supposed. Lucae recommends the use of the chisel and hammer because the operation can be so easily performed with them.

42. In one of GRAF's patients a severe inflammation of the auditory canal appeared, necessitating incision of the protruding lining membrane and of an abscess behind the auricle. There was an evacuation of pus and debris from the meatus. Granulations were found in the canal, and there was also a perforation of the membrane. Recovery, with a moderate amount of hearing, set in after the removal of the epidermal plug.

43. In the introduction to his report ZAUFAL explains how malingering soldiers sometimes produce otorrhœas by using irritant applications. In one case the soldier made use of two pellets of cantharidal plaster enveloped with fine thread, the two pellets being joined by a string.

In a total of 4,960 cases, 109 foreign bodies were found in 100 persons ; 92 were readily removed by means of the syringe, but in the rest, which had become firmly impacted, owing to previous futile attempts at extraction, other instruments were employed. Even these, though mostly seeds of various kinds, could have been readily removed, had the syringe been used before they had become swollen. If the foreign body has passed into the tympanic cavity, through the membrane, and cannot be removed by the forceps, Zaufal does not hesitate to excise a part or the whole of the membrane.

Among the foreign bodies there were 30 which could swell up ; 19 of these were removed by the syringe, 3 by means of instruments without the use of anæsthetics, and 7 under anæsthesia. A bean was removed by means of the galvano-cautery as proposed by

Voltolini ; in the remaining cases the foreign body was extracted by means of hooks and curettes, and in another instance by means of the air douche. There was one case in which a bean having been forced into the depths of the meatus, in consequence of previous attempts at extraction, where chloroform was administered and the foreign body destroyed by the galvano-cautery ; cerebral symptoms set in, terminating four days later in death.

Zaufal does not favor the proposal to treat such foreign bodies as cannot be removed without force on the expectant plan, especially not those which have entered the tympanic cavity ; they should be extracted before dangerous symptoms can make their appearance.

In order to prevent any foreign bodies from swelling, oil should be used instead of water in syringing. Swollen bodies can be made to shrivel by instilling glycerine ; they will shrink even more if alcohol and ether be used.

44. MOLDENHAUER, by partially detaching the auricle, removed a gravel which had been forced far into the auditory canal in fruitless attempts at extraction. A semilunar incision, extending from in front of the auricle to the base of the mastoid process, was made ; the auricle was gradually dissected away and the meatus opened as near as possible to the drum-head. The attempt to extract from above by means of small blunt levers failed. The incision was therefore extended to the apex of the mastoid process. The operator now succeeded in moving the foreign body by applying leverage from below, and then withdrew it from the canal with a forceps. After applying a few sutures the wound healed by primary union. Only after four months did the discharge of pus cease, and the perforation of the membrane heal.

Moldenhauer concludes, from his operations on the cadaver, that it is best to enter the canal from behind and below. "An incision close to the insertion of the auricle will divide the soft parts to the periosteum ; between the periosteum and the cellular tissue we can push forward, detach the cartilaginous portion by means of the scalpel handle, so as to be able to divide the auricle as near as possible to its attachment. In order to loosen the foreign bodies he recommends small, blunt, obtuse-angled levers, which are bent in different directions and whose inner surface is plane and roughened.

45. BARR enters into a general consideration of foreign bodies and the methods of removal. He dwells with emphasis upon the

fact, that it is first of all necessary to make sure that there is a foreign body, and alludes to a case, reported by Pilcher, in which, in their efforts to remove the *corpus delicti*, the surgeons of a London hospital extracted the malleus, whereupon the patient died two days later. At *post-mortem* no traces of a foreign body could be found. For purposes of extraction, the syringe, a blunt hook devised by Lister, and Guye's forceps respectively are recommended.

46. SPEIR says that if a foreign body is lodged in the cartilaginous portion of the canal, it can be removed, or, at any rate, brought near the meatus, if a finger is firmly placed before the tragus, and is then passed upward and around the canal to the auricle and back again. The finger is then taken away and the manœuvre repeated until the body is dislodged.

47. BEZOLD has seen two cases of scalding of the membrana tympani with boiling fluids. Although the inflammatory changes in the canal were not of importance, there was extensive destruction of the membrane with consecutive otorrhœa. The thinner portions of the drum-head were entirely gone, and only the limbus, handle of the malleus, and the uppermost portion of the membrane behind it remained intact. Bezold considers a yellow scab, situated on the apex of the handle of the malleus, and which is probably the necrosed and cicatrized medial zone of the membrane, as pathognomonic of scalds. In one of the cases there was entire regeneration of the drum-head, which was, however, followed by perforation ; in the second case an oval defect remained. The author also reviews the literature of the subject.

MIDDLE EAR.

48. ST. JOHN ROOSA. On the value of operations in which the membrana tympani is incised. These ARCHIVES, vol. x, p. 181.

49. ALBERT BING, Vienna. The diagnostic and therapeutic value of inflation of air into the middle ear. *Allegem. Wien. med. Zeitschr.*, Nos. 30 and 31, 1881.

50. SEXTON. Anomalies of the membrana tympani, etc. *Am. Journ. of Otol.*, vol. iii, p. 273.

51. LADREIT DE LACHARRIÈRE. On swelling and anchylosis of the joints of the ossicula auditus. *Ann. des Mal. de l'Oreille*, p. 133.

52. H. KNAPP. The cotton pellet as an artificial drum-head. These ARCHIVES, vol. x, p. 60.

53. S. Core, Quincy, Ill. Application of cotton pellet in destruction of membrana tympani. *Ibid.*, vol. x, p. 117.

54. B. Löwenberg, Paris. Investigations regarding the occurrence and importance of coccobacteria in purulent otorrhœa, etc. *Ibidem*, vol. x, p. 220.

55. B. Walb, Bonn. On the treatment of otorrhæa. *Deutsch med. Wochenschr.*, Nos. 31 and 32, 1881.

56. Burckhardt-Merian. Borated cotton in otorrhœa. *Correspondenzbl. f. Schweiz. Aerzte*, vol. xi.

57. E. de Rossi, Rome. On the use of resorcin in diseases of the ear. Preliminary paper. These Archives, vol. x, p. 242.

58. R. Steel, Glasgow. Three cases of otorrhœa with destruction of drum-head. *Glasgow Med. Journ.*, No. 6, 1881.

59. Glauert, Berlin. On polypi of the mastoid process. *Arch. f. Ohrenheilk.*, vol. xvii, p. 277.

60. Oscar Wolf. On the exfoliation of the necrosed small bones of the ear. These Archives, vol. x, p. 234.

61. F. Bezold, Munich. A new means for the extension of purulent inflammation from the cavity of the middle ear to the surrounding parts, and the therapy to be employed in such cases. *Deutsche med. Wochenschr.*, No. 28, 1881.

62. E. T. Ely. Pyæmia following a mastoid abscess; treated without medicine; recovery. These Archives, vol. x, p. 42.

63. Hessler, Halle. Erosion of the internal carotid artery due to caries of the petrous bone. *Arch. f. Ohrenheilk.*, vol. xviii, p. 7.

64. Henry Schell, Philadelphia. The cases of mastoid disease in children. *Am. Journ. of Otol.*, vol. iii, p. 207.

65. H. Schwartze. Second series of 50 cases of trepanation of the mastoid process (continued). *Arch. f. Ohrenheilk.*, vol. xvii, p. 167.

66. Louis Blau, Berlin. On the diphtheritic diseases of the ear in scarlatina. *Berl. klin. Wochenschr.*, No. 49, 1881.

67. H. N. Spencer, St. Louis. Giddiness and middle-ear disease. *Amer. Journ. of Otol.*, vol. iii, pag. 187.

68. Chas. H. Burnett. A case of probable syphilitic deafness in one ear. *Ibidem*, vol. iii, pag. 199.

69. Chas. J. Kipp. A case of epithelioma of the middle ear. These Archives, vol. x, pag. 206.

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49. Bing goes into a detailed consideration of the diagnostic and therapeutic value of the common insufflations of air, and as-

pires to impart some further knowledge of the procedure and the mode of compression of the air. He is of the opinion that the entire pressure upon the elastic enveloping tissue of the tympanum only makes itself felt when the air contained in the mastoid cells has been compressed to a maximum degree. Bing believes that if the pressure is increased, it then affects the most elastic portion of the posterior superior quadrant of the drumhead, and then extends to the remainder of the elastic lining membrane.

50. SEXTON describes the common conditions of the drumhead in occlusion of the tympanal portion of the Eustachian tube.

51. LADREIT DE LACHARRIÈRE, first gives us a résumé of the anatomical changes which are based on those already given by Triquet and Toynbee. He attributes this condition, primarily to the different diatheses, such as the arthritic, the dartrous, and syphilitic. Rheumatism and gout, as well as certain neuroses, such as migraine, and those uterine affections which are often found simultaneously with aural affections, may be classed under the first heading. He has often observed that the manifestation of an aural affection corresponds with a disappearance of a rheumatism of the shoulders, etc. He has repeatedly found that there was a decided improvement of hearing as soon as pains in the neighboring organs subsided. The same obtains in the case of migraine. Lacharrière has repeatedly diagnosticated gout merely by an examination of the ear ; the manubrium mallei is said to be greatly enlarged, without any other changes of the membrana tympani. In reference to the second class of disease, the author has often observed swelling of the chain of small bones, where there was eczema, and even pityriasis in the meatus. Here, also, Lacharrière thinks to have observed a peculiar condition of the malleus. Paracusis Willisiana is considered as pathognomonic of disease of the ossicula.

In accordance with these views, the treatment must be general, as well as local. The main feature consists in the administration of 0.5 of the iodide of potash daily. Politzer's douche charged with the vapor of iodine is recommended ; this being generated by means of a Wolff's bottle, which is attached to the nose-piece of the air-bag.

55. WALB directs attention to the importance of applying treatment to purulent affections of the middle ear, and says that he recommended the use of antiseptics four years ago. At that time

he employed glycerine and carbolic acid (25: 1), but latterly has made use of Bezold's boracic acid treatment. Regard must be had to the fact that there may be a fermenting agent in acute as well as chronic inflammation of the middle ear. The secretion only becomes purulent when it comes in contact with air. Walb found that his therapeutic results confirmed his views. Several cases of acute purulent otitis media were speedily cured by the internal administration of large doses of salicylic acid. The author believes that, after the irritants which have caused inflammation have affected the superficies, they penetrate into the tissues, and that they may be destroyed by any substance which is antizymotic, and which circulates in the capillaries, and is contained in every cell. In order to prevent any further fermentation, care must be taken to remove all secretions, and this is best done by means of antiseptics.

If the mucous membrane is much thickened, it will take some time before the inflammation has subsided, and here it is that astringents and caustics are of service. In order to prevent any relapses, the mucous membrane should be made to sclerose, which can best be done by the caustic treatment (arg. nitr.—Schwartze). If this does not suffice, alum may be used; but this is contra-indicated if there be any caries, as in these cases alum will tend to increase the discharges.

56. BURCKHARDT-MERIAN has made borated cotton tampons containing 30% of acid to be used for purulent inflammation of the middle ear. The tampons are conical in shape and kept so by means of a thread which is wrapped around them.

58. The cases reported by STEEL, and seen at Cassell's clinic, were simply chronic purulent middle-ear catarrh, two of them presenting no complication, the third presenting a polypus.

59. GLAUERT'S case was that of a young man in whom a swelling of the superior wall of the meatus was noticed after an attack of acute otitis. A polypus soon made its appearance, the posterior wall and the mastoid processes being painful. The polypus was removed by means of a snare. Singular to say, careful probing failed to find any opening at the seat of the polypus; aside from a slight congestion, no change whatever. Glauert is, nevertheless, of the opinion that the polypus must have come from the mastoid process.

61. The clinical picture portrayed by BEZOLD'S description of the extension of the otitis media is such, that we first have an acute

otitis, with pain over the mastoid, and inflammatory œdema. There is also quite a marked inflammatory infiltration of the posterior superior third of the osseous meatus. After the lapse of a few weeks or months, we have a sudden swelling of the mastoid region, which assumes the character of an inflammation of the muscles which are inserted there. The hard swelling extends to the retro-maxillary fossa and down the neck along the great vessels. We may now have a discharge of the accumulated pus at the junction of the cartilaginous and osseous portions of the auditory canal. The infiltration of pus may extend downward and backward to the median line, and be attended by occipital headache. Incision and drainage may effect a cure, else there will be a fatal issue, owing to exhaustion or to the hypostatic abscesses.

The purulent collections in the neck originate from the pneumatic cells of the mastoid process, the perforation being in the under table. Bezold found the inner plate of the mastoid reduced to a minimum thickness in 32 among 400 temporal bones examined ; there was loss of tissue in 6 cases. In order to determine the exact course which the pus takes, Bezold perforated the mastoid process on its inner wall and injected colored fluids through it. The same swellings, already described in the living subjects, were observed.

Bezold suggests that in these cases the mastoid should not be opened in the usual manner, but instead of that the gauge should be applied to the lower border of the process, which can then be opened throughout its entire substance as far as the incisura mastoidea.

63. As an addendum to his own case, HESSLER gives a detailed description of erosion of the internal carotid artery, due to caries of the petrous bone. He also gives a complete list of all the cases previously reported. Fatal hemorrhage from the carotid was demonstrated in 13 cases, including his own. In 6 other cases, although not proven by necropsies, the hemorrhage, which was diagnosticated, was the probable cause of death. Hessler's own case is reported in detail, both the clinical and *post-mortem* conditions being given. The diagnosis of bilateral caries of the tympanic cavity was made during life, but there was no suspicion of the extensive changes which had taken place. The caries extended on both sides to the lateral sinus and to the middle cerebral fossa, but the pia mater was not affected. Although the left Fallopian canal was entirely destroyed throughout its extent, and the

facial nerve completely exposed, there were no signs whatever of facial paralysis. On the right side, where the hemorrhage occurred, there was, just where the carotid curves, an opening 4 *mm.* long and 2 *mm.* broad. The bony wall was composed of a number of very thin and projecting sequestra.

It appears that in the majority of cases the first hemorrhage set in without any assignable cause. Only in one instance was it determined that it was due to a slight coughing fit, which was unattended by any earache. The walls of the carotid were softened and broken down, to a greater or less extent, in every case. Hessler contends, therefore, that, sooner or later, the impact of the pulse-wave in itself suffices to perforate the coats of the vessel. In one case only did the first hemorrhage prove fatal. The artery was ligated in three cases : in one of these the common carotid was tied ; death ensued three days later from secondary hemorrhage. In the second case the right internal carotid was tied ; no further bleeding, but the case terminated fatally, four weeks later, from pulmonary tuberculosis. In the third case the two common carotids were ligated successively. This case terminated fatally three days after the last operation.

Although the prognosis is a very unfavorable one, the carotids must, nevertheless, be ligated, and, as a rule, if there be considerable hemorrhage, the common carotid should be selected.

64. In two of the three cases of mastoid disease in children, the cortex of the mastoid process could be opened with a probe alone ; this was followed by a speedy recovery. In the other case a large, free incision was made, and a large sequestrum found which could not be removed ; it was touched daily with a pledget soaked in sulphuric acid. Three months elapsed before the case was entirely cured.

65. SCHWARTZE adds, to those already reported, the histories of seven cases of artificial perforation of the mastoid process ; two were simply dilatation of extending fistulæ, three removal of sequestra in children. All of the latter terminated fatally, in consequence of pulmonary tuberculosis, pneumonia, and tubercular meningitis. In another case there was an abscess in the mastoid preceded by acute otitis, with œdema of the surface. A simple superficial incision sufficed to evacuate a torrent of pus ; speedy cure. In the last case a depression of the mastoid, due to a former caries, was reopened, and a large quantity of cheesy matter removed from the antrum.

66. Blau reports a case in which scarlatina was followed by diphtheria of the middle and external ears. This was complicated by transitory facial paralysis and total deafness, abscess and caries of the mastoid. Another physician was compelled, later, to trephine the mastoid. The author also summarizes the different views advanced about aural diphtheria.

67. Spencer reports several cases in which he was able to remove the different symptoms characterizing Ménière's disease, by treating otitis media, which was the exciting cause. If he thinks that every impairment of coördination is due to alteration of the intralabyrinthine pressure, he is greatly mistaken, for it must not be forgotten that disease of the cerebellum also causes similar disturbances.

68. Burnett reports a case, affecting a syphilitic patient, who, without any premonitory symptoms, awoke one morning to find that he was quite deaf on one side and affected with distressing noises. The tuning-fork, when applied to the vertex was heard equally well on both sides ; voice heard close to the affected ear. Burnett considers himself justified in classing this among the syphilitic diseases of the middle ear.

NERVOUS APPARATUS.

70. Prof. Lucae. Diseases of the labyrinth. *Eulenberg's Real-Encyclopædie*, vol. viii.

71. Ladreit de Lacharrière. Otitis labyrinthica. *Ann. des Mal. d' Oreille*, 1881, p. 277.

72. D. B. St. John Roosa. The clinical diagnosis of neuritis and atrophy of the acoustic nerve. These Archives, vol. x, p. 210.

73. August Lucae. On optical vertigo and increased intralabyrinthine pressure. *Arch. für Ohrenheilk.*, vol. xviii, p. 237.

74. August Lucae. Ménière's disease *Eulenberg's Real-Encyclop.*, vol. viii.

75. A Féré and A. Demars. On Ménière's disease and especially its treatment according to Charcot's method. Reprint from *La Revue de Médecine*, Paris, 1881.

76. S. Moos. A case of double labyrinthine affection, with staggering gait and permanent abolition of hearing after mumps. These Arch., vol. xi, p. 13.

77. C. Keller, Cologne. Contribution to the history of acquired deaf-mutism. *Berl. klin. Wochenschr.*, No. 40, 1881.

78. P. McBride, Edinburgh. Nervous deafness. *Lancet*, 1881.

79. Lancereaux. Syphilitic paralyses. *Revue médic. française et étrangère*, No. 46, 1881.

80. Thomas Buzzard, London. On certain little-recognized phases of tabes dorsalis. *The Lancet*, Sept. 24, 1881.

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70. The chapter on diseases of the labyrinth in *Eulenberg's Encyclopœdie* is written by Lucae, and contains a satisfactory summary of the different diseases. In the pathologico-anatomical part he accepts Schwartze's division, adding to them all new and original contributions. Among the latter we must mention those on the extension of otitis media purulenta to the posterior cranial fossa, which Lucae observed. It had extended from a crater in the labyrinth, which was almost 2 *cm.* in diameter and filled with granulation tissue.

Physical diagnosis is fully elaborated. Lucae recommends, for the diagnosis of unilateral, total deafness, that a large, deep-toned tuning-fork be firmly inserted into the external meatus of the diseased ear. If this ear is totally deaf the vibrations will only be heard on the other side. The author directs attention to the unsatisfactory results of the objective examination of the external and middle ear. He has derived the best results by utilizing Rinne's experiment, in conjunction with the determination of the range of perception of high and low tones. If the sound of a tuning-fork (C) is still heard in front of the ear after its vibrations are no longer perceived on the vertex, then we can say that the transmitting apparatus is still able to perform its functions, and the disease must be sought for in the internal ear. If, however, the tone is heard longer on the mastoid process than before the ear, there must be a marked affection of the transmitting apparatus. For the more exact determination of the range of hearing the chronoscope answers best. Among 25 patients, in whom disease of the transmitting apparatus was diagnosed, by the above method, Lucae removed the entire drum-head and the malleus. In none of these cases did the deafness increase, and in several of them a considerable improvement was observed. Lucae also discusses the necrosis, injuries, inflammations, and syphilitic diseases of the labyrinth.

71. In his treatise on otitis labyrinthica Lacharrière gives us quite an elaborate summary of the views now held upon this af-

fection. As far as the acute form is concerned he accepts Voltolini's explanation. In the chronic form, he says that he has achieved satisfactory results by cauterizing the mastoid process, and, especially so, by inserting setons into the neck, in conjunction with the internal exhibition of antispasmodics, or the iodide or bromide of potassium or arsenic.

73. This article of LUCAE's contains little that we have not already noticed in our last report.

74. LUCAE begins his article on Ménière's disease by discussing the physiological experiments of Flourens, Czermak, Goltz, and others, and directs especial attention to the conclusions, which differ from those arrived at by Böttcher, who attributes the disturbances of coördination noticed after injuries of the semicircular canals to simultaneous affections of the brain. According to Lucae's observations, and Baginsky's experiments, it appears to him rather probable, that it is the pressure in the labyrinth increased by a sudden hemorrhagic effusion into it ; but this is also the case in the brain, and, in consequence thereof, the vertiginous symptoms are observed. In one case Lucae found the changes in the labyrinth described by Ménière, but none of the symptoms characteristic of the disease. The deafness occurred suddenly after an attack of meningits. Lucae attributes the absence of the symptoms of Ménière's disease to the fact, that the pressure on the brain was primarily changed by the meningitis.

75. This paper is mainly devoted to a consideration of Charcot's method of treating Ménière's disease. We have the detailed accounts of seven cases, and a plate containing three tracings showing the benefit derived from the quinine treatment. The treatment applied consists of the administration of from 60–80 *cgrm.* of quinine daily, in doses of 0.1 *grm.* This is given for 8–14 days, consecutively, then the treatment is suspended for an equal length of time, and after this the medicine is again given, the same as before, until the desired effect is attained. At first the noises are always increased, and even the vertigo and the falls may recur. During the first interval a considerable diminution of the tinnitus is generally noticed. Further improvement continues during the following stages of treatment. At last the vertigo disappears altogether, and only slight and occasional noises continue.

It is rather singular that the authors, while discussing the Ménière's symptoms, which are caused by peripheric lesions, do not mention local treatment at all, and that, when speaking of the severe forms of the disease, they say, that " the disease continues until the deafness is complete."

77. Keller describes a case of acquired deaf-mutism arising from an illness of 4 days' duration, which was attended by intense fever and mild cerebral symptoms. After this, total deafness and an irregular gait remained. Two weeks later, facial paralysis of one side appeared, which, however, soon disappeared. Keller believes that there had been an otitis labyrinthica, and accounts for the paralysis, by the fact that the facial nerve had become affected in consequence of the inflammation of the labyrinth. This appears to him to be the correct diagnosis, as there were no severe cerebral symptoms (there had been obstinate vomiting, sluggish bowels, and some clouding of the mind). As mild cases of meningitis are frequently observed, Keller's solution is hardly satisfactory. Nor can the author's conclusion, that deafness very rarely ensues after cerebro-spinal meningitis, be accepted as correct (Reviewer).

78. McBride believes that as we attribute epilepsy and other neuroses to unknown disturbances of the nervous centres, we may also in some cases of deafness acknowledge our inability to determine their pathology. We should also remember that it is possible that deafness may be due to purely functional disturbances of the auditory nerve. These cases are generally observed when the rest of the nervous system is also out of order.

79. Lancereaux made a diagnosis of syphilitic tumor of the brain, in a patient who had marked anæsthesia of the eye, cheek, nose, and right half of the tongue, combined with facial paralysis of that side, deafness, and impaired co-ordination. This simultaneous paralysis of the 5th, 7th, and 8th pairs of nerves could only be caused by some affection of the posterior surface of the petrous bone in the vicinity of the apex, where these nerves are nearer together. The diagnosis was confirmed at the autopsy, when a fibrous mass was discovered, which extended from the apex of the petrous bone to the meatus auditorius internus. The nerves were enveloped in the fibrous mass, and the meninges of the brain were adherent to the cerebellum.

80. Buzzard says that Duchenne, Remak, Tobinard, and others have already pointed out that the acoustic nerve may also be affected in tabes dorsalis. But no one suspected the frequency of this complication until Pierrot called attention to it. Since

then McBride has always found a greater or less degree of deafness, though, sometimes, only transitory in its appearance, in every case that came under his observation. Ormerod observed this symptom in 5 out of a total of 13 cases. McBride thinks it possible that the affection of the acoustic nerve may in some cases be a leading symptom, just as in others the optic nerve may be affected, and presumes that certain cases of "nervous deafness" may be accounted for by the presence of tabes dorsalis.

NOSE AND NASO-PHARYNX.

81. GOTTSTEIN, Breslau. Diseases of the nose. *Eulenberg's Real-Encyclopædie.*

82. VICTOR LANGE. The use of the galvano-cautery in the nose and pharynx. International Medical Congress, London, 1881.

83. LÖWENBERG. Contribution to the treatment of simple chronic nasal catarrh. *L' Union Médicale*, No. 104, 1881.

84. GOTTSTEIN. On idiosyncratic asthma. *Breslauer ärztl. Zeitschr.*, No. 15, 1881.

85. WALB, BONN. On the etiology of nasal blennorrhœa. *Arch. für Ohrenheilkunde*, vol. xvii, p. 265.

86. R. CALMETTE. On true ozæna. *Le Progrès Médical*, No. 41, 1881.

87. EDOUARD FOURNIÉ. On the nature of ozæna and its treatment. Intern. Med. Congress. *Revue Médicale*, No. 36, 1881.

88. R. CALMETTE. On nasal hemorrhages. *Le Progrès Médical*, No. 40, 1881.

89. A. WEICHSELBAUM, Vienna. Phlegmonous inflammation of the cavities connected with the nose. *Wien. medic. Jahrbücher*, 1881, p. 227,

90. V. LANGE. On nasal polypi. Copenhagen, 1881.

91. F. KIELLMANN. The operation for nasal polypi. *Hygiea* Stockholm, vol. xliii, No. 6, 1881.

92. GUYE, Amsterdam. Adenoid vegetations in the naso-pharynx. Internat. Medical Congress, London, 1881.

93. BEZOLD, Munich. On the operative treatment of adenoid vegetations in the naso-pharynx. *Aertzl. Intelligenzbl.*, No. 14, 1881.

94. I. WIESNER, Bergen. Adenoid vegetations in the naso-pharynx. Stockholm *Nord. med. Archiv*, vol. xvi, No. 4.

95. CINON. Naso-pharyngeal polypi. *Gazette des Hôpitaux*, No. 73, 1881.

81. Gottstein gives a succinct sketch of nasal diseases. In the introduction he discusses the different methods of examination, and particularly that through the anterior nares. Among the symptoms he lays particular stress upon the importance of stenosis.

After this we have a description of the different diseases, beginning with acute coryza. In treating this Gottstein has been able to cut it short by ordering insufflations of salicylic acid. Rhinitis acuta blennorrhoica is a disease which is characterized from its beginning by a purulent secretion, and is either due to infection (gonorrhoic matter, blennorrhoic secretion *inter partum*) or to some dyscrasia. Gottstein is not in favor of considering chronic nasal catarrh as dyscrasic.

In the chapter on the pathologico-anatomical changes we fail to find mention of Steinbrügge's careful investigations, while E. Fränkel's and Krause's views of ozæna are given in detail.

In accordance with his previous writings, Gottstein differentiates between an exudative stage of chronic catarrh and the period of retrograde metamorphosis, atrophy of the mucous membrane, the latter corresponding with ozæna.

In conclusion we have a brief review of syphilitic and tuberculous nasal affections, as well as neoplasms and foreign bodies.

82. Lange gives us a summary of the usual methods of employing the galvano-cautery in the different diseases of the pharynx and nose.

83. Löwenberg insists upon the importance of the galvanocaustic treatment of chronic nasal catarrh. In order to prevent any injury of the adjoining parts, especially of the nasal septum, he makes use of a new cautery. The part which is to be heated is placed on the side, and not on the end, of the cautery, and consists of a raised piece of platinum. Löwenberg thinks it very important that this instrument should be employed when there are small spinous projections of the septum, which must always be injurious when the usual instruments are used. This instrument can also be used for reducing the size of hypertrophied tonsils.

84. One of Gottstein's patients suffered from chronic coryza and asthmatic attacks, which invariably set in when he came near ipecac. The attacks began with repeated sneezing, which was followed by profuse discharge from the nose. In order to determine whether the asthma was due to the irritation of the nose, Gottstein filled the nostrils with cotton ; thereupon the attacks

were greatly lessened in severity, and often did not appear at all. This is not absolutely conclusive, as the posterior nares were not tamponed.

85. WALB makes a brief report of a case in which a carious tooth extended into the antrum of Highmore, causing a purulent inflammation of this cavity, which extended into the nose. Any sudden movement of the head, or any bending forward, caused a flow of pus into the nasal cavity ; but only on that side corresponding to the diseased tooth. After extraction of the tooth, a probe was easily passed into the antrum through the alveolus. There was a continuous trickling of pus through the fistula, which was not checked for some time.

86. CALMETTE gives a *résumé* of the most recent views on ozæna. He agrees with Zaufal, who attributes the disease to abnormal size of the nasal cavity.

87. FOURNIÉ also gives a summary of the different explanations of the etiology of ozæna now most in vogue. He does not endorse Zaufal's views, but believes that the odor of ozæna is caused by the accumulation of the secretion of the muciparous glands, and that it is the peculiarity of the patient which causes a pathological secretion from the glands, just as in other organs we may have abscesses, diseases of bone, etc. The nature of the secretion is determined by a specific alteration of the glandular substance. There must, therefore, be a constitutional cause for the disease. Fournié recognizes two types of ozæna, the dry and the moist. In order to improve the general condition, he employs, in the moist form, sulphur baths, and in the dry form, alkaline baths which are alternated with arsenical baths. For local treatment, he employs Gottstein's tampons ; and solutions of boracic acid and salicylate of soda for the removal of the fetid odor.

88. In one of CALMETTE's patients who suffered from repeated nasal hemorrhages, ozæna and a number of small polypi were found. The removal of the latter had no effect on the epistaxis. After the next hemorrhage Calmette found a number of bloody streaks on the inner surface of the nostril. Removing these he saw a small black spot, from which, when touched with a probe, arterial blood issued. Cured by means of the galvano-cautery.

89. WEICHSELBAUM has seen five cases of phlegmonous inflammation of the pneumatic cavities connected with the nose, *i. e.*, of the antrum of Highmore, the frontal sinuses, the sphenoidal and ethmoidal cells.

Phlegmonous inflammation of these cavities may be divided into two categories: in one the exudation is of a serous nature throughout (acute œdema), and in the other principally fibrinous. It is the latter which concerns us here. When the phlegmonous process is at its height, spherical or semi-spherical infiltrations are found studding the mucous membrane and making the surface uneven. These are simply called plaques. Their contents are fibrinous masses mingled with a purulent fluid. The mucous membrane lying between the plaques is more or less inflamed. The cavities are filled with a variable quantity of muco-pus. The inflammation was always greatest in the maxillary antrum. The changes found in the nasal cavity were hardly of any consequence.

Under the microscope, cellular infiltrations were found first; fibrinous deposits later: both of these in foci, attended with enormous dilatation of the vessels and numerous sanguineous extravasations. The larger plaques contain a fibrinous exudation. If this be purulent, it will be filled with micrococci, which are also found in the adjoining cavities.

In two of the cases under consideration the disease was primary in one doubtful, and in the other two secondary.

In the primary cases the disease progressed with unusual rapidity and fatality, the patients dying within two and four days respectively. On *post-mortem* it was found that the spine was enlarged, and also the liver and kidneys; there were ecchymoses on the pericardium and pleura.

Weichselbaum does not consider himself justified in terming the disease an erysipelatous inflammation.

90. Lange gives a summary of the most common methods of treating nasal polypi, and appends the history of five cases. We also find an illustration of a modification of Wilde's snare.

91. Kiellmann makes a few remarks on the application and utility of the wire snare.

92. In order to prevent the development of adenoid vegetations and to hinder a renewed growth after operation, Guye advises that a "contra-respirator," preventing the entrance of air, be worn day and night. For operative purposes the finger nail should be used, which will generally answer every purpose.

93. Bezold employs Wilde's snare, which is passed in through the nose. He makes use of the stiff steel wire, so that the loop can retain its original shape. By this means he has repeatedly

been able to remove proliferations from the lateral walls of the naso-pharynx. In the case of children, or when the passages are greatly constricted, he uses an artificial finger nail, a sharp spoon, which is put on the distal phalanx of the finger.

94. WIESNER's monograph is based on previous papers on the same subject. We also find the histories of several cases. He is inclined to believe that the scrofula which often attends adenoid vegetations should be considered as an effect and not as the cause of the disease.

95. CINON removed a naso-pharyngeal polypus by securing the pharyngeal portion with a suture passed through the mouth ; then a thread was introduced by means of a Bellocq's canula through the nose, passed around the root of the polypus, and attached to the chain of an ecraseur. The ecraseur divided the growth from its attachments by linear incision. Only slight hemorrhage followed, and the polypus, which was myxomatous, was drawn out through the mouth.

MISCELLANEOUS NOTES.

The American Otological Society will meet at the Fort William Henry Hotel, Lake George, N. Y., on July 25th.

Prof. Politzer, of Vienna, informs us that the second volume of his text-book is completed, and will be issued about June 15th.

Dr. Edward Woakes, so well known by his work on "Deafness, Giddiness and Noises in the Head," has been appointed senior aural surgeon to the London Hospital.

VOL. XI. No. 3.

ARCHIVES OF OTOLOGY.

REPORT ON 806 CASES OF EAR DISEASE TREATED IN PRIVATE PRACTICE DURING THE YEARS 1880 AND 1881.

By H. KNAPP.

THE following pages contain a tabular statement with incident remarks of all the *new* ear patients that have come under my private care during the years 1880 and 1881. They are less numerous, but have the advantage of being better and longer observed than the hospital patients.[1] I do not purpose in this report to go extensively into details, but only to point out what is of somewhat rarer occurrence, and to state what mode of treatment has been adopted for the different diseases. In the methods of treatment, I fear, many will censure me for various omissions, for I have always endeavored to reach my objects with the simplest means possible, not thinking it incumbent upon me to try every new remedy as soon as its first introduction reached me. How many propositions have been made in aural therapeutics during the last decades, that had only an ephemeral existence!

I have abstained from the customary mode of tabulating the *results* of treatment, as some cases were seen only once or a few times in consultation, and too many ceased attendance before the disease was terminated to make numerical statements sufficiently reliable. The records of the cases have been carefully made by myself as long as the patients were under observation, so that in preparing this report, I scarcely ever had to resort to my memory. The numbers represent patients, not diseases, and even if the two ears had different affections, only the most important was recorded.

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[1] The number of ear patients treated during the same period of time at the N. Y. Ophthalmic and Aural Institute by myself and the assistant surgeons, Drs. T. R. Pooley, E. Williams, R. O. Born, and R. C. Brandeis, was 2,014, that of the operations 101.

CLASSIFICATION OF DISEASES AND OPERATIONS.

A.—*Outer Ear.*

1.	Eczema of auricle and ear canal	14
2.	Freezing of auricle	1
3.	Partial perichondritis	1
4.	Total perichondritis, chronic	1
5.	Diffuse inflammation of the outer ear	15
6.	Furuncles in ear canal	21
7.	Exostosis of canal	3
8.	Impacted cerumen	73
9.	Aspergillus	11
10.	Cockroach in canal	1
11.	Closure of canal	2
12.	Bilateral rudimentary auricle and closure of canal	1
13.	Myringitis traumatica	1
14.	Traumatic rupture of membrana tympani	1
		146

B.—*Middle Ear.*

15.	Acute catarrhal otitis	38
16.	Subacute catarrhal otitis	33
17.	Chronic catarrhal otitis	280
18.	Acute suppurative otitis	64
19.	Subacute suppurative otitis	15
20.	Chronic suppurative otitis	190
		620

C.—*Inner Ear.*

21.	Heredito-syphilitic deafness	6
22.	Ménière's disease	14
23.	Deafness from cerebro-spinal meningitis	5
24.	One-sided deafness from mumps	1
25.	“ “ epileptic attacks	1
26.	“ “ malaria (or cerebro-spinal meningitis)	1
27.	“ “ no cause	1

28.	Hardness of hearing from explosion	1
29.	Deaf-mutism with total deafness	10
	Total,	40
	Grand total,	806

D.—*Operations.*

1.	Tonsillotomy	4
2.	Wilde's incision	2
3.	Removal of polypi	11
4.	Paracentesis of drumhead	6
5.	Opening of mastoid process	2
6.	Exostosis chiselled off	1
		26

A.—*Outer Ear.*

The first thing in treating **eczema** was thorough removal of all substances, crusts and the like, that could by decomposition or otherwise irritate the skin. This was effected by warm soap baths, syringing and carefully wiping the auricle and walls of the canal. Immediately afterward the reddened parts, in acute cases, were anointed with a 1% or 2% yellow mercurial salve (Hydrarg. oxid. flav., 0.15; vaseline cold cream, 10.00 grams), and covered with absorbent cotton for the sake of protection from wind and cold; in chronic cases, especially when ulceration or excoriation was present, a 1% to 3% solution of nitrate of silver was painted over the cleansed and sore parts, which were then covered with yellow ointment and absorbent cotton. I have more minutely described the whole management of these cases in a previous paper.[1] All the cases under observation were speedily—within a few weeks—cured. Some recurred by exposure or carelessness on the part of the patients, but the strict adherence to the above rules of treatment caused the relapses more quickly to disappear than the previous attacks.

The cases of **perichondritis** were treated with incision, drainage, and compressive bandage. In this way the one entered as partial perichondritis seems to have been prevented from becoming general. In hospital practice I have seen this result in several instances.

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[1] These ARCHIVES, vol. x, p. 346.

Diffuse inflammation of the ear canal was either traumatic, or the consequence of irritation from foreign bodies and medicaments, or the extension of inflammation from the middle ear. In one case it resulted from cold water entering the ear during bathing. The inner half of the canal was evenly red, the *Mt* sunken; $h\,\frac{1}{24}$, $V\,\frac{20}{60}$. After inflation, the *Mt* in its normal position, $h\,\frac{15}{24}$, $V\,\frac{20}{20}$. In another case, that of a lady 60 years old, it was caused by the insertion of an earring " to draw the soreness out of an inflamed eye." The next day, when she presented herself, the whole ear was red, swollen, and moderately hard, and the canal occluded. There was no particular pain, or excoriation, or discharge.

In another case, which was brought about by a plug of cerumen, the symptom of **ear-cough**, from reflex irritation, was very marked. As often as the nozzle of the syringe touched the canal, an irresistible fit of coughing ensued. The treatment in all these cases consisted in the removal of the cause, assisted, in some, by painting the parts with a 3% solution of nitrate of silver, to cause contraction of the relaxed cutis.

Furuncles, when they were small and superficial, were left alone; when they were extended and deep, they were poulticed with the ordinary flaxseed meal in a cornucopia, or the prepared and compressed Iceland moss poultice. So soon as they became soft or pointed, they were lanced. As to the propriety of operative interference in furuncles of the ear canal, my experience has been that early incisions, *i. e.*, before pus is formed, do not accelerate the recovery and cause unnecessary pain, whereas delay or omission of the incision retards the recovery, and is apt to cause burrowing of pus under the adjacent parts with partial absorption, partial sacculation, followed by relapses. It is of importance to mature the furuncle fully, and keep the surrounding tissue free from incrustation with scales or dried secretion, in order to avoid a succession of furuncles in the neighborhood. I know of no better substance for cleansing the ear canal than lukewarm soap water. It saponifies the fat, and removes all kinds of filth most efficiently. The ear may then for a short time be protected with absorbent cotton. This treatment, as far as my experience goes, is sufficient to cure aural furuncles speedily and prevent relapses. If future investigations should bear out Löwenberg's views that microörganisms are the primary cause of aural furuncles, antiseptics would be our chief reliance. Granulations and polypoid excrescences, which sometimes follow furuncles, are, as O. Wolf has clearly pointed out, the result of insufficient removal of the secretion, and require operative interference only in neglected cases. Cleanliness and the instillation of alcohol make them shrink and disappear rapidly.

Only three cases of **exostosis** are noted, since only those were entered under this head in which the exostosis was the principal affection. Flat and mammillary exostoses of a moderate degree are not uncommon in chronic catarrhal or purulent otitis. One of the above three patients consulted me on account of a very unpleasant feeling from the retention of water in her ears after syringing on the day previous. She had been subject to accumulations of ear wax, which could only with difficulty be syringed out, and then the ears, for a day or two, would remain filled with water. I found in the inner portions of both ear canals at the anterior, lower, and posterior walls, a ring-shaped nodular ridge of bone, occluding about half of the calibre of the canals. The water was easily wiped out with absorbent cotton put on a dentist's holder. The *Mtt* and the acuteness of hearing were normal. The bony ridges were slightly hyperæmic and the starting-points of the most pronounced **reflex ear-cough.** When I touched the exostosis with a polished metal ear-probe, for the sake of verifying the diagnosis, the patient began to cough. A momentary touch was followed by one fit of coughing only, but a prolonged contact produced prolonged coughing; on the whole the coughing began at once with the touching of the exostosis, remained uninterrupted as long as the probe was in contact with the bone, and ceased as soon as the probe was withdrawn.

In the second case, the circular exostosis apparently filled the canal completely, as the skin was in contact in the centre, yet a probe could be passed through it. The introduction of laminaria bougies dilated the canal to about 3 *mm.* in diameter. The patient heard well, and was not annoyed by her affection, which was only in one ear, and had developed imperceptibly.

The third case was that of a young man whom I had treated off and on for an obstinate otorrhœa on one side. By treatment and care the discharge would temporarily stop, but at the end of the posterior upper part of the canal there always remained a slight red prominence, in which every now and then a polypoid excrescence took its origin. Snared off, it would return; alcohol made it shrink, but did not prevent it from reappearing later. On examination with a probe, a small nipple-shaped exostosis was found in the centre of the elevation. I passed a curved grooved hook around it, but was unable to break it off. I therefore denuded it on its anterior surface, and chopped it off by means of a small chisel and a mallet. The patient soon improved. He went home, and has up to date—a year—not been heard from.

The majority of the cases of **impacted cerumen** were uncomplicated, the hearing and condition of the parts after the removal being normal. Relapses were not uncommon even in cleanly people. I make this statement on the strength of careful notes, as some authors assert that earwax in the majority of cases, and almost always when it collects repeatedly, is complicated with chronic inflammation of the middle ear. To know whether the accumulation of cerumen is an idiopathic affection or not, has a practical bearing, as in the former case our professional acquaintance with the patient ends with one visit; in the latter case the primary disease has to receive our attention. The removal of the wax, even of large and hard plugs, rarely requires more than a few minutes, without any preliminary soaking. I take this opportunity to express my indebtedness to Dr. O. D. Pomeroy for his modification of

Toynbee's syringe. If well made,[1] this syringe is an elegant and excellent instrument. It is capacious, goes smoothly, and the flange prevents the returning water from being spattered about. The thin and long nozzle is introduced carefully ½″ or more along the upper wall of the stretched canal, and the stream, which can be made as gentle or as powerful as desired, will soon drive the plug out through the lower unobstructed part of the meatus. On my journeys I have seen even aurists of renown who were in the habit of prescribing for every patient who presented himself with a plug of cerumen, an emollient wash to be used at home. The patient had to return in a few days to have the important operation of removal of ear-wax performed. All this is unnecessary waste of time. To prevent relapses, I advise patients to bathe their ears every now and then with lukewarm soap-water. Warm soap-suds are held in the ear for about 15 minutes, then stirred with a camel's hair brush as deep in the canal as the patient can reach; then the ear is syringed with lukewarm water, wiped dry, and for a short time protected with a little absorbent cotton.

As a slop bowl I prefer the usual black hard-rubber basin to all others. It is simple, light, and affords an immediate and easy inspection of the parts removed, an advantage which is lost by using cylindrical or conical bowls, such for instance as described by Dr. Wilson.[2]

The number of cases of **aspergillus**—11 among 806—is unusually large when compared with the very small number —2 among 2,014 cases—that were observed during the same time at the dispensary. This discrepancy can, it seems, only be explained by the fact that in dispensaries, as a rule, less careful examinations are made than in private; yet Lucae,[3] who found only three cases of aspergillus among 2,388 ear patients treated policlinically at Berlin during three years, mentions the same difference, and is of opinion that aspergillus prevails more among the wealthy than among the poor. The assistants at the clinique are perfectly familiar with the symptoms of aspergillus in the ear canal, for I have frequently shown them specimens of the affection, and admonished them to examine microscopically every collection the appearance of which deviates in the least from the common plug.

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[1] Tiemann, 67 Chatham Street; Reynders, corner 4th Avenue and 23d Street, and others.

[2] These ARCHIVES, vol. x, p. 204.

[3] "Statistische Übersicht," etc. Leipzig, Hirschfeld, 1878.

Many microscopic specimens thus prepared were examined by myself, yet only twice was aspergillus found. I need scarcely say that the diagnosis, which in the majority of cases could be guessed at from the macroscopic appearance, was never recorded before it was verified with the microscope. The numbers show that the disease is about as frequent in America as it is in Europe. In one case the mould was found in an ear affected with chronic discharge; in another a cotton-pellet which, moistened with glycerine lotion, had lain for some time at the bottom of the canal and served as an artificial drumhead, was found covered and pervaded with aspergillus nigricans. This shows that the parasite, though mostly growing on dry ground, is exceptionally also found in combination with purulent discharge. Similar cases have been reported by C. H. Burnett, and others. The treatment consisted in first filling the ear with lukewarm soap-water for a quarter of an hour, then careful syringing and wiping out with absorbent cotton, then instilling one or two parts of nitrate of silver dissolved in 100 parts of strong alcohol. This was done twice a day at the beginning, later on more rarely. A perfect cure was obtained in from two to six weeks, in all cases.

The easy recognition and management of this disease, for which we are chiefly indebted to Wreden, of Petersburg, adds a great deal to the credit of the aural specialist with the laity. As an example I may be permitted to relate the history of one of the eleven cases here under consideration.

An elderly gentleman, a prominent citizen of New York, had of late to his great annoyance become hard of hearing. His family physician attributed it to his advancing years, and treated it with internal remedies. The patient endured deafness and tinnitus resignedly, but when an intolerable itching set in in one of his ears, he decided to consult an aurist. I found subacute aural catarrh in both ears, with whitish and black membranous deposits in the depth of the meatus in one. Syringed out and placed under the microscope the deposit showed the graceful filaments and æsthetic—*sit venia verbo*—fruit-heads of aspergillus nigricans in luxuriant development. I could not deprive myself of the satisfaction of letting him look at them himself. Then I inflated his drums by Politzer's method, which raised his hearing from $\frac{1}{60}$ to $\frac{20}{60}$. He went home no less astonished than delighted. The next day his daughter came to ask me what I had done with her father. At the dinner-table he had carried on conversation as lively as ever, had spoken with enthusiasm of his visit at my office, and remarked that there was something sublime, even divine, in the science and art of medicine. "I went to the doctor," he said, "suffering and deaf; he discovered a mould plantation in my ear. After he had rooted that out, he blew into my nostrils the breath of life, and my hearing was restored."

In one case only a **foreign body** was found in the ear. It was a cockroach, which during the night had crept into a man's ear and there, by its movements on the drumhead, had made such a distressing noise that he sent for his family physician, who killed the insect by pouring chloroform in the ear. The patient's suffering was ended at once, but the family physician would not undertake to remove the animal for fear of injuring the drumhead. It easily came out by syringing.

There were two **cases of closure** of the ear canal: the one was bony and acquired, from chronic otorrhœa; the other, membranous and congenital, is the case which I described in the present volume of these ARCHIVES (xi, p. 19) and in which the attempt at restoring the calibre of the canal was frustrated by hemophilia.

The case of bilateral bony closure of the ear canal with rudimentary development of the auricles has likewise been described in these ARCHIVES (vol. x, p. 119).

The cases of **traumatic inflammation and rupture of the drumhead** were treated by nothing else than the wearing of a protective plug of absorbent cotton. They recovered in less than a week. When a healthy drum membrane is ruptured by some cause or other the first maxim of treatment is: "hands off." Washes of any description can only do harm, boracic acid or other powders can do no good, since the possibility of bacterial infection is only an imaginary fear. If there is blood or serum in the ear canal, it ought not to be syringed out, but wiped out with absorbent cotton. The universal experience is that wounds of a drumhead will speedily heal if left alone.

B.—*Middle Ear.*

The above classification of the diseases of the middle ear is very concise, as the sequelæ of inflammation have not been, nor do they deserve to be, recorded as special diseases. The great variety of changes in the membrana tympani, the formation of polypi, pre-auricular and post-auricular abscesses, caries, necrosis, exfoliation of bone, etc., are all consequences of inflammation of the middle ear.

As to the etiology and course of the cases of **acute aural catarrh,** there was nothing remarkable.

In one case, during the presence of marked symptoms of **secondary syphilis,** a gradual impairment of hearing occurred in the right ear, and sudden loss in the left. The patient was a lady, 43 years old; her husband a debauched man. She had suffered from catarrh for two years, but without noticeable diminution of hearing. Six months before she consulted me she had an eruption over her entire body, which, though pale, was still visible when she came to me. She had psoriasis palmaris and plantaris, lost her hair, and had pharyngitis. I found circumscribed red patches on the soft palate, the right *Mt* dull, the left reddish. h 0, $V \frac{2}{60}$; Politzer's experiment raised h to $\frac{1}{\infty}$ and V to $\frac{8}{60}$. I gave her pills of biniodide of hydrargyrum 0.02 a day; further, inunctions of mercurial ointment twice daily, and mercurial baths twice a week. Under this treatment, and Politzer's experiment three times a week, she improved gradually and steadily. She was under my care from Oct. 2 to Oct. 27, 1880; then she went to Florida. Though there was manifest inflammation of the middle ears, the sudden and high degree of hardness of hearing in the left indicated implication of the labyrinth.

If the patients came to me early, I insisted on their staying at home and in bed, until the constant acute pain and the nightly paroxysms were over. I advised them, further, to keep up a moderate perspiration, take an aperient, and put leeches before or behind the ear. Those that followed my advice, almost without an exception, made a rapid and good recovery. It was gratifying to notice how quickly the redness and bulging of the drumhead disappeared. I am satisfied that this treatment, in many cases, prevented perforation of the membrana tympani, purulent discharge, and their consequences. I consider acute otitis media, be it catarrhal or purulent, as an important disease, and know by experience how well applied are a few days of rest and faithful attendance to medical advice at the beginning of this affection. Knowing that in acute catarrhal and suppurative inflammation of the conjunctiva, the removal of the secretion and the application of cold are the controlling therapeutical agents, I think that for the analogical diseases of the drum cavity, *paracentesis* and *cold applications* must be of benefit. In spite of this and their warm recommendation by very good authorities, I have but little experience with either of these procedures. *Paracentesis* would give an outlet to the secretion, and could be supplemented by inflation and suction. Though being aware of these advantages, I have yet a natural aversion against this operation, for I dislike opening any cavity of the body and putting its interior in direct communication with the atmosphere. The tympanum is not a closed cavity indeed, yet the air which passes through the Eustachian tube is warmed, filtered, and received only at intervals. Performing the paracentesis of the drum and the cleansing of the ear under spray, and applying a protective bandage, for which a plug of absorbent or medicated cotton will suffice, is to employ a cumbersome apparatus for a very small wound. Although this may be unnecessary and the cotton or boracic acid powder a sufficient protection, I yet prefer to cure the disease, if possible, without a wound in the drumhead.

The *application of cold* to the lining membrane of a cavity more than an inch removed from the surface, is a desideratum for which it is difficult to find the right procedure. Although I consider attempts in this direction perfectly legitimate, the superior results both of paracentesis and the application of cold have not yet been so forcibly demonstrated as to induce me to abandon the above-described simple and efficient mode of treatment.

In the cases of **subacute and chronic catarrh,** the treatment of the nasal and pharyngeal mucous membrane is of the greatest importance. In catarrhal pharyngitis I advise the patients to use alum, tannin, and chlorate of potash gargles in solutions not stronger than one or two per cent., directing them while gargling to throw their heads well back, and make, according to Tröltsch, besides the gargling some swallowing motions, or actually to swallow a small quantity of the solution. In this way the remedy comes in contact with the naso-pharyngeal mucous membrane, and some drops will even flow out through the nose when the head is bent forward. To act upon the nasal mucous membrane, I advise the patients to dip a middle-sized camel's hair brush into the astringent liquid—which I commonly give weaker than for gargling,—put the brush into the nostrils, and draw the liquid up by forcible inspiration. Thus the mucous membrane of the nasal passages is moistened in a very simple and gentle way. When the patients come to the office, I spray their nose, palate, and naso-pharynx with weak astringent solutions, for instance, sulphate of zinc 1:100, by means of a hand atomizer. I have discarded the *nasal douche* altogether, not only because every now and then a patient, despite all precautions, uses it so as to get water into his ears, causing severe otitis, but principally because I do not think it rational to deluge with any solution those cavities through which, in the physiological condition, no watery liquid ever passes. When voluminous, hardened, or tenacious collections are to be removed, I use by preference the *posterior nares syringe.* To act on the E. tube and middle ear I employ inflation by Politzer's method and the catheter, followed by injections of mild astringents into the tubes, two or commonly three times a week. In injecting liquid through the E. catheter I am always careful to use only a very small quantity (a few drops), which must exhaust itself in the tube, and not penetrate into the tympanic cavity. If this is disregarded, and the injection is successful, the patients commonly feel sharp pain, and the *Mt* becomes red immediately afterward. Several times, when I was less on my guard, this accident has happened, and in spite of the beneficial effect of the immediate performance of Politzer's experiment, the pain would last from one half to several hours, in exceptional cases one or several days.

Adenoid granulations, on which the discussion has been so lively during the last years, were not infrequently seen in combination with subacute or chronic aural catarrh. Although I have always been in the habit of abscinding hypertrophied palatal tonsils, I have abstained from operating on those formations in the naso-pharynx. In young children I have treated them with gargles and injections of a 1% or 2% solution of nitrate of silver by means of the posterior nares syringe, carefully regulating the children's hygienic conditions. The progress was slow in all cases, yet the results, on the whole, very satisfactory. Gradually these glandular intumescences would disappear; a healthy-looking mucous membrane took their place; the children would breathe easily through the nose and keep their mouths shut at night. The injections of nitrate of silver were made 2 or 3 times a week for about 2 or 3 months in succession, then interrupted, and later begun again in the same manner, according as the season would furnish indications. I have a disinclination against all destructive methods (cauterization and operation) of dealing with these hypertrophies, for I am afraid that, with the excrescences, also the normal parts may be destroyed, and thus that most uncomfortable of all pharyngeal diseases, the so-called dry catarrh, be brought about, in which the mucous membrane is converted into cicatricial tissue. The analogon of this is the xerosis conjunctivæ, so commonly observed after trachoma. Partial cicatrization, which the earlier oculists termed *xerosis glabra*, is very often seen at the posterior pharyngeal wall of patients suffering from subacute or chronic aural catarrh. The surface represents a mesh work of shining white scars, in the islets of which prominent patches of mucous membrane are preserved. This process, extending into the E. tubes, will most efficiently narrow and even obliterate their calibre. How should we treat this condition, and, what is of still greater importance, how should we treat its preliminary stage, the follicular catarrh? Experienced laryngologists tell me that there is a certain number of cases in which cicatrization will be the unavoidable termination, whatever mode of treatment be instituted. The same opinion is held by many oculists concerning the issue of the trachomatous process. For a certain number of cases I am willing to subscribe to it, but for their great majority I feel convinced that a cure can be effected with preservation of the mucous membrane. The principle of treatment, emphasized by Von Gaerfe and now almost universally adopted, is to use remedies sufficiently irritant to cause hyperæmia and absorption, but not to destroy the trachoma granule. Guided by the good results obtained from this maxim in ophthalmic practice, I have preferred the slow and sparing to the rapid and possibly destructive way. When the adenoid vegetations and the obstructions of the nose were so developed as to require surgical interference, I have sent the patients to laryngologists more experienced in managing them than I am. The discussions on this subject, the criticisms by Hartmann[1] and others, and the remarks in Dr. Schalle's last paper,[2] are sufficient proof of the difficulty, if not of the uncertainty, still prevailing in the different modes of treating these proliferations.

Many of the 280 patients affected with **chronic aural catarrh,** were only examined, not treated. It is of importance to ascertain the conditions on account of which treatment has to be pronounced useless. If (1st) the patients were advanced in life, (2d) the hearing power not or only little subject to variations, (3d) the naso-pharynx and middle ear free from changes indicating still persisting inflammation; if, moreover, (4th) inflation both by the air bag and catheter had no influence on the hearing, I did not undertake to treat the patients, but gave them a candid statement of their condition with such rules as appeared most conducive to retain what hearing power there was left. A sunken and perfectly pale drumhead, with a pervious E. tube, and no increase of hearing by inflation, is not sufficient to abstain from treatment, as long as a more or less inflammatory condition of the nose, pharynx, and tubes is present, the cure of which will at least greatly contribute to render the hardness of hearing stationary, and in not a few cases will supprise us by a considerable and lasting improvement of hearing. Among the cases there were a few only of sufficient interest to be specially reported.

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[1] *Deutsche med. Woch.*, No. 9, 1881.

[2] These ARCH., vol. xi, p. 132, etc.

One of the patients heard a marked buzzing noise only when higher tones were sounded. With the tones of a piano it was not noticed, but quite well when high tones were sung, and very distinctly when a König's rod of 12,000 vibrations was struck. He had old cicatricial pharyngitis, sunken drumheads, and pervious tubes. Another case, however, may be related, as it furnishes an example in what way preposterous damage-suits are instituted and won in the city of New York.

On Feb. 2, 1880, a lawyer of my acquaintance came to me with a man of 39 years of age, a native of Bavaria, for whom he wanted to obtain $5,000 from the Elevated R. R. Company for damaged hearing by an accident. Patient related that July 3d, 1879, a piece of iron 1″ thick and 3″ or 4″ long fell on his stiff felt hat while he was passing under the elevated railway. With a bleeding head he was taken to Chambers Street Hospital, dressed, and sent home. He had pain in the head and felt dizzy, but did not stagger. Four weeks after the accident, when the wound had healed, he began to have noises and became hard of hearing, which has gradually been worse. For the last four months his memory has been weak. An ulcer formed on the side of the nose, extended, and was followed by ulcers on the right side of his head. When the lawyer presented him to me these ulcers were still present, but covered with scabs and filth. The left ala nasi and adjacent part of the cheek and upper lip were swollen, dark red-nodular, and ulcerated. On the left side of the head a scar in the scalp $\frac{3}{4}''$ in extent, not connected with the bone. Some glands in nape of neck swollen. The soft palate and the centre of the hard palate occupied by extensive white and stellate scars. Ulcers and swelling of cricoid cartilages; vocal cords red. Patient has been hoarse for four weeks. Pharynx and mouth of E. tubes congested and swollen. Phimosis; scars on prepuce. Right *Mt* evenly dull, whitish, reflex small, relief normal; left *Mt* sunken, white at periphery, reflex only a dull point. L h $\frac{1}{\infty}$, bone-conduction uncertain; R h $\frac{1}{24}$, bone-conduction good. V R $\frac{20}{60}$, L $\frac{5}{60}$. Tuning-fork from forehead heard on right side only. When the right ear is held closed, he pretends to hear no longer, or only very faintly, the tuning-fork vibrating on his forehead, whereas, when that ear is left open, he says he hears the tuning-fork well. Inflation by Politzer's method unsuccessful; by means of the catheter, difficult. No improvement of hearing.

Though the patient denies ever having had a chancre, the symptoms of constitutional syphilis are quite pronounced. Certain it was, that the piece of iron which fell on his head had nothing to do with the impairment of his hearing. He had marked chronic aural catarrh, caused or aggravated by constitutional syphilis. Moreover, he was a malingerer, for he was at once caught by Moos' test for detecting simulated one-sided deafness, which is as follows: when a person pretends to be deaf in one ear, and hears the tuning-fork from the glabella well in the other when left open, but no longer when it is held closed, he is sure to simulate.

I communicated the result of my examination to the lawyer, adding that my testimony, if the case came before the jury, could only be prejudicial to his client. Whether the case was tried or settled by compromise I do not know, but some months later, when I met the lawyer again, he told me, with the happy expression of a man who has accomplished a good action: "I got $2,000 for the poor fellow."

The sixty-four cases of **acute suppurative otitis** repeated in general the conditions which I described in detail, in a previous paper, based on 183 such cases.[1]

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[1] These ARCHIVES, vol. viii, p. 1, etc.

Some may be specially mentioned.

A lady of 33 years of age had *pneumonia*, followed by earache and perforation of *Mt.* Three weeks later intense headache set in, lasted five days, and was promptly relieved by Wilde's incision. Recovery.

A healthy infant had *ophthalmia neonati* and *otorrhœa* at the same time. The eye disease was permanently cured and without sequels, in five weeks, by cold applications and careful removal of the secretion. The otorrhœa ceased at the same time, but relapsed sixteen months later, and was cured in a few weeks.

A young lady in the habit of using the *nasal douche* for nasal catarrh, had singing noise, but no direct pain whenever she used the douche. Had no ear trouble before. One application was followed on the right side by earache immediately, and discharge the next day. I found the *Mt* of the other ear intensely red and its posterior part bulging. I perforated it two days later. Recovery of both ears in six weeks, with perfect hearing and normal condition of *Mt.*

A man, 44 years of age, had suffered for ten months from cough and coryza with loss of smell, for which he had used the *nasal douche.* A week before he came to me while using it again, and having the water warm with some salt in it, he felt in both ears a sudden pain, which, in the night, became violent, and was followed by discharge. Remission during the days, but exacerbations with deliria during the nights. Hearing lost from the beginning. I found both *Mtt* perforated, the mucous membrane of the drum cavities red and swollen ; tick of the watch heard neither from ear nor skull. The tuning-fork was heard through air and bone, its sound not intensified by closing the meatus ; voice only at a distance of 3″ on each side. After Politzer's inflation, the tick of the watch heard on contact everywhere ; voice R $\frac{12}{60}$; L $\frac{8}{60}$; both together $\frac{18}{60}$. Treatment : leeches, rest in bed, cleansing with absorbent cotton, introduction of impalpable boracic acid powder, and inflation by Politzer's method. Relief immediate, discharge rapidly diminishing ; on the 11th day after his first visit, both *Mtt* entire ; on the 15th cleansing themselves, but still red and without reflex. $V\ \frac{3}{60}$, by Politzer $\frac{30}{60}$. Politzer continued for two weeks longer. Recovery perfect.

A man of 30 years contracted, in the Catskill Mountains, June, 1880, a violent nasal catarrh, for which he *snuffed up cold alum water.* Six hours later intense pain in both ears and in the left occipital region. The pain was moderate during the day, but violent at night, depriving him of sleep. Ten days after the onset he came to me. I found the right *Mt* slightly, the left intensely, red and bulging in its anterior and posterior portions, so that the handle could not be made out. The watch heard on left side neither on application to the ear nor to any part of the skull; when applied to the forehead and teeth, it was well heard in the right ear, not at all in the left. Patient refuses to have paracentesis made. Politzer's inflation successful with a snap. Watch immediately afterward well heard on left ear and mastoid. The inflation relieved him until that evening; the night he had pain again; free the next day, suffering greatly the night. The day after this I found the posterior part of the *Mt* bulging like a bladder, the size of a split pea. Paracentesis at that place. The needle was moist with pus, and Politzer's method drove out several drops of creamy pus. Relief for several days, then violent earache again; tenderness and puffiness of mastoid region. These symptoms increased for a few days; the pain was intense and radiated to the top of the head. The creamy discharge which had been considerable during the first days after the paracentesis had stopped. On the sixth day I found the opening closed and the *Mt* bulging again. I therefore repeated the paracentesis, this time not contenting myself with a puncture, but made a *long incision.* Pus was liberated and relief afforded at once. Recovery in four weeks.

In three cases the disease was brought on by *scarlet fever complicated with diphtheria.* Two of them are not without interest. In one, a very severe case, the diphtheria laryngis et faucium was complicated with diphtheria of one eye, which had a large corneal ulcer with infiltration of the whole cornea when the patient came under my charge. The eye was destroyed. Both ears had acute suppurative inflammation without diphtheritic patches. One ear recovered, the other had a large destruction of the *Mt*, with formation of polypi. These were removed and the discharge cured, but the hole in the *Mt* was not closed when patient was last seen, about six months later.

The other case was that of a boy of 3 years who, in the second week of scarlet fever, had discharge from both ears and *complete deafness.* When I was called in consultation I found a large perforation of the *Mt* and great swelling of the tympanic mucous membrane on both sides. Neither before nor after Politzer's experiment was there any sign of perception of sound. The boy was conscious, directed his eyes to every new object that was brought before him, but reacted on no sound, not even on that of a large tuning-fork passed, vibrating, from behind up and down his ears. This condition lasted about a week. I could give the parents only the consolation that such cases would not infrequently occur in the course of scarlet fever, but that only exceptionally the hearing remained permanently abolished. Under judicious general treatment, the application of astringents to his naso-pharynx, careful cleansing, and the use of boracic acid in the ears, the hearing gradually returned ; in one ear there was *restitutio ad integrum ;* in the other the *Mt* remained perforated for months, polypoid excrescences developed and were removed ; the discharge and swelling of the mucous membrane disappeared, but there were occasional relapses.

In another case *diphtheria* of the throat was complicated with purulent otitis on both sides without specific manifestations of diphtheria in the ears. Both ears were cured.

The *bad effect which syringing* has in some cases, is illustrated by the following example.

A boy of 10 years had coryza the whole winter of 1880 to 1881 ; earache two months before he came to me, was better, but worse the last week ; $h\ \frac{6}{24}$, $V\ \frac{20}{60}$ each ear. Left *Mt* pale, right bulging, red ; walls of adjacent part of canal red and swollen ; pharyngitis. Ordered leeches and alum gargle, and used Politzer. Improved for a week, but then perforation of *Mt* and discharge. Relief. A week later, when the walls of the canal were less swollen, he syringed the ear with lukewarm water to which a little salt was added. It caused intense pain for hours. The next day he syringed it again, and suffered violent pain from it immediately afterward and the whole night. When he came to see me the following morning, I found him pale, his right mastoid tender and swollen, a large perforation of the *Mt*, and great swelling of the tympanic mucous membrane. I gave him quinine 0.60 *pro die*, advised him to keep his bed, not to syringe the ear any more, but dry the secretion up with absorbent cotton. He improved at once, the hole in the *Mt* closed in two weeks, and he recovered perfect hearing.

This is not the only case in which I have seen syringing do harm, and no doubt on the strength of similar observation some aurists have advanced the opinion to discard syringing altogether, replacing it by wiping with absorbent cotton. This would be going to the other extreme, and deprive us of one of the most valuable procedures. The indications for syringing may be stated as follows. In recent and uncomplicated perforations of the drumhead, of which the traumatic rupture is the prototype, no liquid—in general no substance of any kind, air inclusive—should be introduced into the tympanic cavity. In acute perforative otitis the secretion should be wiped out with absorbent cotton. If the discharge continues for several days, is copious, and the wiping insufficient or painful, syringing with lukewarm salt or boracic acid water should be tried, and the repetition made dependent upon the absence of reaction. In chronic suppuration, syringing is indispensable, so much so that the ordinary syringe in some cases must be supplemented by one with a thin nozzle curved at its end, which is introduced into the tympanic cavity,—also into the mastoid cavity when it is opened,—turned in different directions so that the stream, regulated in its intensity by the irritability of the parts, washes out the recesses of the cavity. Numerous such tympanic syringes have been described. The one which I use has a very thin nozzle fitting on an Anel's lachrymal syringe, and is bent at both ends, so that it can be introduced and employed under the guidance of a forehead mirror. Only in this way secluded masses of inspissated pus and decomposed debris of tissue, upon which the action of antiseptics is no more than skin deep, can be dislodged.

In some cases the inflammation extended to the periosteum of the canal and mastoid process, which condition, in children, is quite common, and forms the well-known postaural abscess, of late so well described in its features by Bezold.[1] A prompt recovery commonly follows the evacuation of the pus by an incision behind the ear. One case, where the patient refused operative interference, and perfect spontaneous recovery took place, may be reported.

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[1] *Arch. f. Ohrenh.*

A young man, 17 years of age, had a cold and earache a week, then discharge, $h\,\frac{1}{\infty}$; $V\,\frac{10}{60}$. Syringing, nitrate of silver, $\frac{1}{5}$ %, instilled twice daily. Three weeks later proud flesh as large as a split pea protruded through the hole in the *Mt.* Ear cleansed with absorbent cotton. The discharge stopped, but the walls of the ear canal, the post-aural region, and the upper half of the sterno-mastoid muscle were swollen and tender to the touch. He had headache and nausea, the pain was at the top of the head, not at the side.

It was evident from the symptoms that the inflammation had extended to the periosteum of the adjacent parts.

I advised a deep incision, but the patient refused it. He preferred having it treated as an internal disease, would lie in bed, steam his ear, put warm water in it, take quinine and hot tea to provoke perspiration. The inflammation at once subsided. The discharge returned, but remained moderate, ceased altogether in a week; the swelling in the ear canal and the sterno-mastoid muscle soon disappeared. At his last visit, 32 days after the onset of the grave symptoms, the recovery was perfect, his *Mt* restored, and $v\,\frac{20}{20}$.

Another case, that of an engineer of 30 yrs. of age, was remarkable by the *acuteness and severity of the symptoms.* It is reported in detail in the "Transactions of the American Otological Society" of 1880. I shall therefore only briefly mention it here. By exposure a sudden attack of tinnitus, earache, pain in mastoid region of the right side, dizziness, tendency to fall forward and to his right side, speech slow, the whole right side of head heavy and very painful by spells; a week later, when he presented himself, the same subjective symptoms. Right *Mt* white, dull, bulging in posterior part. *Paracentesis* and Politzer liberate a considerable quantity of sero-purulent substance. The symptoms from the ear abated, but the mastoid region remained tender, and there was violent pain radiating thence over the whole corresponding half of the head, with nightly exacerbations. The patient went to the hospital, but as rest and careful treatment did not diminish the headache, I *trephined the mastoid* and let out a moderate quantity of thin pus. His pain subsided at once, and did not return. In two weeks the discharge stopped, in four weeks the perforation of the drumhead closed, and in six weeks (after the trephining) the recovery was perfect, with $v\,\frac{20}{20}$. No relapse.

The 15 cases of **subacute suppurative otitis** referred to patients who, in the course of chronic otitis media, either catarrhal or suppurative, had acute attacks of suppuration. These attacks were treated as primary suppurations, until the previous condition of comparative freedom from inflammation was reëstablished. One was quite remarkable for the intensity of cerebral symptoms:—violent headache, nausea, dizziness, staggering gait, no sleep at night. The objective symptoms were only in the tympanic cavity and osseous canal; the mastoid was neither tender nor swollen. I enlarged the opening in the *Mt*, had the ear steamed, cleansed with absorbent cotton, as syringing increased the dizziness even when it was done gently and with the head bent toward the syringe. There was no optic neuritis—which, on the whole, seems to be a rare complication of otitis, yet I have seen unmistakable examples of it,—and the patient without an operation recovered from the acute attack in six weeks. It required six weeks more to stop the discharge and render him fit for his business.

In another case, that of a young man of 16 years of age, the relapses of otorrhœa, which had occurred repeatedly every year, were at once and permanently cured by bilateral tonsillotomy, furnishing another example, if any were still needed, of the usefulness of this comparatively simple operation. Another case showed the same favorable result after the destruction of adenoid proliferations in the nasopharynx.

The last group of middle-ear diseases, the **chronic suppuration,** was represented by 190 cases. Not only this great number, almost 25 % of the whole, but also the variety and importance of morbid conditions shown by and resulting from this group will easily explain why otitis suppurativa chronica requires more of the aurist's labor and time than any other group, perhaps almost as much as all other groups of ear disease together. His active interference is called for, from the simple act of efficient cleansing to operations which even in the most expert hands have shown a mortality of over 10 %. The first step in the treatment of chronic purulent otitis is *thorough cleansing.*

If the discharge be not copious, the cleansing may be begun with wiping it out with absorbent cotton, which will demonstrate its character and odor. Syringing, however, is mostly indispensable, as the cotton will not penetrate into recesses and fissures as well as water does. On the other hand it is necessary mechanically to remove collections of dry scales, inspissated pus, or ropy tenacious mucus, over which the water will pass without dislodging them. The performance of cleansing an ear should never be considered as being below the dignity of a well-established physician; it requires time, efficiency, and delicacy, to which the patient is entitled, and I do not hesitate to say that regular and thorough cleansing in chronic suppurative otitis is half the cure.

Next comes the application of remedies:—antiseptics, disinfectants, astringents, caustics. An invaluable remedy is good absorbent cotton. After the thorough cleansing a plug or wick of absorbent cotton will protect the diseased mucous membrane from the action of the atmosphere, and convert the open sore or wound quasi into a subcutaneous one. The atmospheric air is never pure, but more or less impregnated with inorganic and organic, dead or living particles. Without being ardent bacteriologists we can easily understand that after a perforation of the membrana tympani the exposed drum cavity would be injuriously influenced by the air. On the one hand the soft tissue would exsiccate by evaporation, or on the other it would inflame by the contact of extraneous particles. Absorbent cotton could protect it from the latter, while the exsiccation might be prevented by an impenetrable plug. This, however, is unnecessary, for the exsiccating effect of the atmosphere is more than counterbalanced by the moist secretion resulting from the inflammation. The secretion, as far as it does not organize, must decay and irritate the living tissue. To remove the surplus of secretion, *i. e.*, that part which is not required for keeping the mucous membrane moist and in proper chemical composition, and to prevent it from assuming irritant qualities before it can be removed, form the main object of dressing wounds or open surfaces in general.

We have to see how these objects can best be attained in the particular case under consideration, when the destruction of the membrana tympani has converted the middle ear into an open surface. The insufflation of impalpable boracic acid powder seems to answer that purpose better than any thing else. My own experience is quite in accord with the favorable opinion which this remedy, introduced by Bezold into aural practice, has generally received. Based on these principles the treatment of *uncomplicated* cases of chronic otorrhœa would consist in :

1. Careful attention to the condition of the nasal passages, palate, pharynx, and Eustachian tubes.
2. Inflation by the air-bag and the catheter.
3. Thorough cleansing of the tympanic cavity.
4. Insufflation of impalpable boracic acid powder into the ear.
5. Introduction of a wick of absorbent cotton.

These procedures have to be repeated once, twice, or three times daily, according to the small or large amount of the secretion. In general, the dressing has to be renewed as soon as the powder becomes moist. In this way the cases of protracted otorrhœa from scarlet fever, sea bathing, etc., were cured ; those with a constitutional disease, scrofula, tuberculosis, etc., were also benefited, though other local remedies had commonly to be substituted from time to time. Before boracic acid was introduced into aural practice I commonly used, and still use, solutions of astringents in alcohol and water, according to Löwenberg. Nitrate of silver or sulpho-carbolate of zinc, 1 or 2 parts to 50 parts of alcohol and 50 parts of water, was the common strength. If the mucous membrane of the drum cavity was swollen, or granulation tissue developing, the part of alcohol was increased over that of water, not infrequently to using alcohol alone, according to Weber–Liel. I have found alcohol very efficient in reducing swollen mucous membrane, and may add here that I can fully concur with Politzer, who recommends it so highly for making polypi disappear by gradual shrinkage. Lately I have followed Löwenberg's advice in mixing finely powdered boracic acid with alcohol and water, taking 10 grms. of boracic acid to 30 grms. of alcohol and 30 grms. of water. Before use the solution has to be shaken. Löwenberg states that in this way the boracic acid comes in contact with the whole expanse of the tympanic mucous membrane, whereas when used in the form of a powder, it would not reach the many recesses of the drum. My experience confirms Löwenberg's opinion of the good effect produced by the above combination.

Of the specifically so-called antiseptics and disinfectants I have used carbolic acid, hypermanganate of potash, resorcin, and boracic acid in watery solutions, but have not found them better than the ordinary astringents.

If there was granulation tissue in the drum, and symptoms of retention of pus, the granulation tissue was scraped out with a sharp spoon, and the return of the discharge favored by warm water baths and steaming. In several cases treated in this way, opening of the mastoid, which seemed indicated, could be avoided.

The hardened, scaly collections in desquamative otitis were first softened and loosened by pressing a plug of absorbent cotton, soaked with glycerine, deep into the ear canal. The plug was left in position a few days, then removed, and the collections syringed or wiped out. To thoroughly remove them commonly required several repetitions of this procedure.

When despite the above treatment the granulations returned persistently, especially when the discharge continued offensive, I not only removed the granulations, but scraped also the underlying bone, according to O. Wolf, in order to remove small particles of necrosed bone.

I have never been partial to the application of strong remedies, for instance, solutions of nitrate of silver stronger than 2 %, of chromic or nitric acids, or the like; neither have I used the much-praised galvano-cautery in the ear.

This leads me to speak of the management of **aural polypi,** of which, in the course of years, a considerable number have come under my care. The principle of my treatment has been to let them grow until they became pedunculated, then seize them at the pedicle, and draw them out with

Hinton's polypus forceps. Only when they were small, succulent, and projected well into the canal, I snared them off. For years past I have never touched a polypus with caustics of any kind, since by doing so the growth of this neoplasm is only accelerated. Not even the roots of polypi, as a rule, were touched with caustic. This mode of treating aural polypi I derived from my observations of conjunctival polypi, which in former years came to my notice quite frequently. When, in strabotomy, the tendon is not cut close to its insertion into the sclerotic and the wound is not closed by conjunctival sutures, it is not uncommon to see proud flesh sprout from it, which gradually develops into granulation tumors of considerable size. If touched with nitrate of silver, as I have seen in older surgical clinics, the growth may assume a fungoid character, cover the cornea and protrude beyond the palpebral fissure. I know that an eye was removed after having been persistently treated, or rather maltreated, with caustics, because the "granulation growth had been convered into soft cancer." This was 20 years ago. If the conjunctival polypi are left alone for one or two months, only care being taken that the conjunctival sac be kept clean, their basis contracts into a small pedicle, which ultimately tears. Thus the polypus is cast off, and the disease cured, for the root of the pedicle shrinks away. We need not, however, wait for this spontaneous elimination of polypi, but snip them off as soon as they become pedunculated. The root will disappear by itself.

As to **aural polypi,** I think that everybody must have made the experience that large polypi are easier to deal with than small ones. They can readily be seized with forceps or snares and drawn out, the snare mostly being only a modification of the forceps, both acting by traction. There is a much greater chance radically to extirpate the polypus in this manner than by cutting it off with the cold or hot wire of the one or other kind of écraseur.

The plan of treatment, therefore, is as follows: If a polypus presents itself in such a form as to be easily seized with forceps or snare, it is at once removed in order to save time. If, however, it has a broad base, or if there are several, and the removal is difficult, or if there are remnants left after an operation, the growths are subjected to the alcohol treatment, but not cauterized in any way. The effect of the treatment is carefully watched, and especial attention paid to the avoidance of retention of pus. The syringing is done very thoroughly, and the curved nozzle of the tympanic syringe may be used with advantage.

As far as my present experience goes, the alcohol is apt to lose its effect in from four to eight weeks. If, then, the polypi are not shrunken, and begin to increase again, their growth need not be interfered with, as long as there is no danger and the patient experiences no particular discomfort, until they have become pedunculated and can be removed entire. During this period of growth careful cleansing and the use of mild washes, such as solutions of boracic acid, permanganate of potash, resorcin, chloride of sodium, and the like, may be used, so that when the polypi are removed the alcohol has a good effect again on the roots and the swollen mucous membrane of the drum cavity. To resume:

1. Begin with removing the polypi if it can be easily done.
2. If not, try the alcohol and nitrate of silver treatment to make them shrink.
3. If they resist, let them grow until they become pedunculated, but take care that no retention of pus ensue; cleanse thoroughly, and use mild washes.
4. Remove the polypi with the forceps or snare when they can be well grasped and extracted or snared off as a whole.
5. Use as after-treatment alcohol either pure or in addition to nitrate of silver, 1 % or 2 %, or impalpable boracic acid powder, 10 % to 20 %.

This definite plan of treatment has given me much more satisfaction than the constant nagging at the excrescences, here destroying a little fragment, there stimulating another, thus keeping the parts of the drum cavity and its vicinity in a state of constant irritation, until at last strong cauterization is resorted to, and not only the polypi, but also the surrounding parts, are destroyed to a greater or less extent.

In returning to the old procedure of avulsion of polypi, I am well aware how severely it has been criticized. The greatest objection raised against it is, that portions of the *Mt* or of the ossicles may be drawn out together with the polypi. No doubt this has happened, and a number of such cases are on record. I have not met with such an accident in my own practice, probably from the reason that I did not introduce the forceps as deep as it could reach, and seizing all the tissues it could grasp, but because I waited until the polypus was pedunculated, and afforded a firm hold either at its pedicle or body, to extract it without endangering any integral parts of the hearing organ. The beauty of this plan is the completeness of the operation, the simplicity of the after-treatment, the rapidity of the recovery, and a great freedom from relapses.

Sclerosis of the mucous membrane of the drum cavity was chiefly treated with Yearsley's cotton pellet. Thickening of the *Mt*, with a clean, permanent perforation, was treated in the same way, or with Blake's paper discs. As I have but recently published the results of my endeavors in this direction,[1] I must not dwell on that subject in this place. In the present series six cases are noted in which the pellet had a permanently good effect.

Of the greatest importance were those cases in which the **inflammation extended beyond the tympanic cavity,** of which the following examples may be mentioned.

Polypus, caused by necrosis in the osseous part of the ear canal.—A young lady, æt. 17, had suffered from otorrhœa and hardness of hearing since her eighth year, after scarlet fever. When she presented herself on 5th Oct., 1881, there was a most offensive discharge from both ears, tinnitus, and considerable pain in ears and surroundings, as well as headache ; *h* R $\frac{1/3}{24}$, L $\frac{1}{24}$; *V* R $\frac{2}{60}$, L $\frac{10}{60}$. In the right ear the mucous membrane was greatly swollen. By treatment it was reduced, the discharge stopped, and the hearing raised to *V* $\frac{20}{60}$. In the left, polypoid excrescences which filled the inner part of the canal, shrank completely under alcohol and boracic acid treatment; the hammer lay bare, and was immovably united to the pale promontory. A large perforation of *Mt.* From the posterior wall of the inner end of the osseous canal an uneven, porous, dirty-gray, more or less dry bony mass projected into the canal, about the size of a split cherry-stone. It became slightly movable shortly before the patient left New York, 17th May, 1882, grated and partially broke under the efforts of extraction with the grooved hook, but was still too firmly attached to force its extraction. The patient, for the last month, had had no inconvenience, and was satisfied with the hearing she had acquired in her right ear. The hearing in the left remained $V \frac{10}{60}$, not improved by cotton pellets. She went home, to Chicago, with the advice to have her ears examined from time to time, and the sequestrum extracted from the left when it shall have become loose.

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[1] These ARCHIVES, vol. xi, p. 60, etc., and "Transactions of the Seventh Internat. Med. Congress," London, vol. xii, p. 380, etc.

During her treatment in New York she stayed with her relatives. I showed her how to cleanse and treat her ears, so that during eight and a half months she made no more than a dozen visits at my office, and yet the progress of the recovery was as rapid and undisturbed as could be expected. I mention this to illustrate that officious nursing is none of a physician's business.

There was a certain number of cases in which *internal and external periostitis of the mastoid*, with more or less severe general (chills, jaundice, fever) and cerebral (headache, nausea, dizziness, vomiting) symptoms occurred, from which the patients recovered, without an operation, by rest in bed, perspiration, warm ear douches, steaming, cleansing the canal from obstructions, and the internal use of quinine 0.60 *pro die.*

Two patients *died.* I saw both in consultation only when the fatal termination was imminent.

The one was a boy of 10 years, who had long suffered from chronic purulent otitis on both sides. When I saw him, March, 1880, he had had convulsions and ptosis for the last twenty-four hours; he had neuro-retinitis on both sides, groaned, was difficult to rouse, and very fretful. He had profuse otorrhœa, and the canals were filled with polypoid granulations, which were at once drawn and scraped out. Death two days later. No autopsy.

The other was a young man of 22 years of age, who had had otorrhœa from infancy. Ten days previous to my visit he had an attack of fever, headache, vomiting, jaundice ; the discharge from the ear had suddenly stopped. This condition persisted ; pulse 100, temp. 99° ; no neuro-retinitis, great prostration. Polypi and proud flesh in right ear, after the removal of which the promontory felt rough, and a small piece of dead bone was scraped off. Death six days later. No autopsy.

In both cases the mastoid was not implicated ; in the latter, caries and necrosis of the petrous bone could be diagnosticated with certainty ; in the other the propagation of the disease may have taken place through the tegmen tympani.

C.—*Inner Ear.*

With regard to the cases of impairment of hearing from **hereditary syphilitic taint,** I may refer to a former paper.[1] One of the cases there related, the child of well-to-do parents, who recovered her hearing by careful nursing and treatment, had a relapse a year later, but recovered from it in three weeks. I have since watched the occurrence of impairment of hearing in connection with parenchymatous (heredito-syphilitic) keratitis, and have found that it is infrequent. Even low degrees of hardness of hearing, of which two sisters were examples, are rare.

The one was 14 years old ; had had, when she presented herself, interstitial keratitis for 5 months in the right, and for 4 weeks in the left eye. She complained of tinnitus aurium ; *h* was R $\frac{24}{24}$, L $\frac{36}{24}$, which for the right was below the average in a child of 14 years. The pharynx was injected, the *Mtt* pinkish. Hearing distance for voice normal.

Her sister was six years old. She had had pain in her ears 6 months, the whole winter, especially when blowing her nose. *Mt* R pinkish, sunken ; L a little paler than normal. Pharynx slightly injected ; *h* $\frac{15}{24}$ in each ear, *v* $\frac{20}{20}$. The parenchymatous keratitis began three weeks before she presented herself, in both eyes at the same time. Both sisters had typically notched teeth. They were seen in consultation. No record of their further history.

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[1] These ARCHIVES, vol. ix, p. 146.

Another case was that of a servant girl, 17 years, who in the 8th week of interstitial keratitis had a sudden earache on the left side, lasting the whole night, connected with tinnitus, dizziness, and a constant tendency to fall. The next morning I found *h* $\frac{18}{24}$, *Mtt* dull, reflex diminished in size, at periphery of *Mt* some red dots and fine vessels. Two weeks later she had another attack of earache which lasted a week. It began suddenly with almost total deafness. Tinnitus less marked, no dizziness. The hearing gradually improved, and when she presented herself to me at the end of the week I found *h* $\frac{12}{24}$, upper folds and handle red, simple pharyngitis, tubes pervious. No further notes.

It is evident that in these cases the symptoms of disease of the inner ear are coupled with symptoms of inflammation of the middle ear:—congestion, catarrhal swelling, earache. From the observation of other cases I may here state that the *milder* forms of ear disease—those where there is not a very high degree of deafness—from hereditary syphilis, commonly recover their hearing unimpaired or but little impaired.

One of the cases was that of a young man of 19 years; 4 years previous to his coming under observation he had parenchymatous keratitis, the typical picture of the heredito-syphilitic form, which lasted 7 months, and his cornea still showed the marks. His teeth are normal. The patient dates the beginning of his ear disease to sleeping in a cold, insufficiently covered roof when he was employed as barkeeper in a Western town. Confesses to have had a chancre at that time, but on inquiry no secondary symptoms could be discovered to have followed it. He had had dizzy spells and tinnitus for a whole year, his hearing gradually became worse and worse, and some months before he returned and was brought to my office, he had been totally deaf. I found him a strong-built, healthy-looking young man, whose deafness on both sides was absolute. No sound was heard through air or bone. Catarrhal pharyngitis; tubes pervious. R *Mt* dull, but relief normal; L dull, and somewhat sunken. Adjacent parts of canal narrowed by moderate swelling of bony walls.

I put him under strict mercurial treatment: subcutaneous injections of sublimate, inunctions, mercurial baths, etc. In order to avoid all outward disturbances he took a private room in the hospital, where he stayed over three months, faithfully carrying out all ordinations. When the mercurial treatment had had a full action and there was no improvement in six weeks, he took iodide of potassium in increasing doses up to 12 grams daily. This was of no benefit either. Then he took Hg and KI combined. His pharyngitis and the slight dulness of the drumheads disappeared, but he remained completely deaf and was discharged as incurable.

Among the 14 cases of **Ménière's disease** there were several in which this well-known complex of symptoms occurred in the course of chronic catarrhal or purulent otitis; in others it was of traumatic origin; in others, again, it was meningitic or apoplectiform. I will specially mention only those cases which are somewhat remarkable.

A gentleman of 48 years became suddenly deaf in his right ear; dizziness, no vomiting, but staggering, inclination to turn to the left; lasted six weeks. Different kinds of noises have remained permanent; swelling of feet and face; a nettle rash on skin; lost his hair. *Mtt* n. H o in R, good in L. Sight and interior of eyes normal.

The history of this case is from notes taken by Dr. R. O. Born, who examined the patient during my absence, Aug., 1881. The lesion probably was a hemorrhage or serous effusion into the right labyrinth of a syphilitic man. He writes me that his deafness remained the same.

In a case of one-sided catarrhal deafness in a man of 36 years, attacks of headache, nausea, vomiting, vertigo, staggering, etc., had been quite frequent during the last 14 months, when his physician brought him to me for consultation. His physician sprayed his pharynx, blew iodoform into his pharynx and tubes, and made him take Déclas' syrop iodophénic. The attacks of aural vertigo disappeared, the deafness remained.

In the following case of a cerebral disease the impairment of hearing was combined with impairment of sight, which led to permanent blindness, whereas the hearing was restored.

A child of 7 years was brought to me Jan. 5, 1880, after an attack of headache, nausea, vomiting, and staggering, which began at 2 A.M. and lasted until 11 A.M. A year previously she had had a similar attack, with delirium, lasting four days. No convulsions, but numbness of fingers at the beginning of each attack. *St. pr.* : R. pupil large, immovable ; L sluggish ; for the last three weeks gradual diminution of hearing, tinnitus like a drum, dizziness, and tendency to fall toward her left side. R $V \frac{1}{60}$; L $\frac{6}{60}$; *Mtt* fairly normal. Neuro-retinitis with stellate figure at yellow spot in both eyes. She took calomel, $\frac{1}{2}$ cgrm., three times daily ; later iodide of potassium with it. Her headache and hearing gradually improved. After six weeks' treatment her hearing for two weeks was quite well, then became worse again. It was then $\frac{20}{60}$. In two months and a half the optic discs were atrophic, the hearing $v \frac{15}{20}$; had spasms at night. At the beginning of April (in four months) she had no perception of light, but the hearing was perfectly restored. Not long ago I accidentally learned that the child had died.

Not knowing what the intracranial lesion was, I may, nevertheless, from the symptoms draw the conclusion that the acoustic nerves may have been affected in a way similar to that of the optic nerves, only less intensely. Brain lesions in general, such as tumors, for instance, may possibly affect the acoustic nerves as often as the optic nerves, and if the conditions of strangulation—choked disc—are not present in the ear as they are in the eye, we may see the acoustic nerves recover their function, whereas the optic waste away.

A man, æt. 52, having chronic aural catarrh. H reduced to V R $\frac{2}{60}$, L $\frac{1}{60}$; the symptoms of Ménière's disease for years had been quite marked. He stated that his hearing and aural vertigo were always worse after coition, in which he had, matrimonially, indulged to excess for 33 years.

The 5 cases of **cerebro-spinal meningitis** were all in children ; the deafness was binaural and absolute. One child died in the third week, after having been deaf for ten days. No autopsy. When I examined her during her illness her pupils reacted as usual ; the optic discs and tympanic membranes were normal. She was completely deaf. None of the four surviving patients had eye disease.

The case of **one-sided deafness from mumps** was as follows :

A young lady, æt. 15, consulted me May 25, 1881. She had had mumps two months previously on each side, lasting two weeks. During the decrease of the swelling on the right side, she heard at first a ringing noise in her right ear, then a roaring noise which is still present, and her hearing became impaired. I found both *Mtt* normal, and one like the other; *h* R o, no bone-conduction ; L $\frac{36}{24}$, bone-conduction good. *V* R $\frac{½}{60}$ (from sound reaching other ear), L *v* $\frac{20}{20}$. Tuning-fork R faint and even, L well and in puffs. When tuning-fork vibrates on forehead, and she closes her left ear, the sound is stronger ; when she closes or opens the right, the intensity of sound remains the same.[1]

The case of **deafness from epileptic attacks** was that of a man of 37 years of age, who for many years had suffered from sleeplessness. Two years and a half before he consulted me he had had a sudden (the first) attack of epilepsy, which was followed by general weakness for three weeks. Two months later he had another attack, which repeated often during the day, and left him deaf. Noises ever since ; hearing no better. I found the *Mtt* and middle ears normal, *h* o, T F o. He thought he heard loud voice, but could not understand it in any way. Optic nerves and sight normal.

The case of **deafness from malaria,** or cerebro-spinal meningitis, is very remarkable.

A young man of 17 years of age had always been well until the evening of the 20th March, 1881, when he had chills in the evening, lasting a few hours. He vomited during the night. The next morning he felt dizzy, was drowsy and delirious ; he grew maniacal at noon, and totally unconscious in the evening ; his temperature was high, and he vomited all he took. This condition lasted three days. Being the son of wealthy parents he was treated by several of the most experienced and renowned physicians of New York. At first morphine was injected. On the third day his consciousness returned. The physicians—with the exception of one who diagnosticated cerebro-spinal meningitis—

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[1] Of late, I have also come across a case of double-sided deafness from mumps, in which, as in the case recently published by Moos (these ARCH., xi, p. 13), attacks of aural vertigo are still present, now six years after the disease.

thought he had a violent attack of malaria, and gave him, when he had awaked from his stupor, a dose of 2.5 grams of quinine which he kept, then 0.30 every two hours ; from the next day 0.30 three times daily for several days. After the first dose of quinine he had most intense buzzing in both ears, which several days later disappeared from the right ear, but not from the left, which also has been deaf ever since. For six weeks he felt weak, and staggered. He went to Europe, had a very rough passage ; also when he returned late in August, but was not at all seasick, whereas on former voyages he had always been very sick. When he consulted me, 22d Oct., 1881, I found nothing abnormal in either ear on physical examination; h R $\frac{36}{24}$, L $\frac{1}{\infty}$ (ear and mastoid), namely, the watch was heard when applied to the left ear and mastoid ; it was better heard when at the time his right ear was held closed, but no better from the mastoid when the left was closed. Tuning-fork applied to the left mastoid, the same result ; when vibrating on the forehead, it was heard on the right side only, better when the right ear was stopped, no difference when the left was stopped. The tuning-fork passed up and down before the left ear was heard evenly, the same as when passed up and down before the face, but in distinct puffs when moved before the right ear.

I declared, of course, the left ear completely and incurably deaf, the same as the one-sided deafness after mumps, but do not know whether the primary disease was malaria or cerebro-spinal meningitis. One-sided deafness from the latter disease does occur, but is very rare ; I remember only one case from my own experience.

The patient had never before suffered from intermittent fever, nor does he live (57th Street, between Fifth and Sixth avenues, New York City,) in a particularly malarious neighborhood.

The case of **hardness of hearing from an explosion** in blasting rocks, to which the patient was quite near the day before he consulted me, I have entered among the diseases of the inner ear, because there was absence of abnormity in the sound-conducting apparatus. Politzer's experiment, however, raised the hearing acuteness somewhat, yet no higher than to $V \frac{15}{60}$. In the other ear the hearing was normal. We may, I think, assume that by the violent shock from extraordinary strong sound-waves the cochlea can undergo changes like those which we ophthalmoscopically notice after concussion of the eyeball in the background of the eye, namely, a milky opacity and capillary hemorrhages in the retina, and small ruptures in the choroid and other tunics. The patient was not seen again, probably was well soon.

None of the ten cases which were entered as **deaf-mutism** showed any unusual features.

D—*Operations.*

The above table, p. 201, does not contain all the operations, as only such cases were noted in which the operation was an essential factor in the management of the case. Partial excision of hypertrophied tonsils, for instance, was not infrequent in the treatment of chronic otitis. I commonly perform this operation with a Yearsley's knife, holding and drawing out the part to be removed with a large pair of forceps, the fang-like teeth of which are on the side. When the tonsils, however, are large, and form round or oval, well-projecting lumps, I remove them with a guillotine tonsillotome. Only once in my whole practice has this operation been followed by profuse hemorrhage, occurring when the patient had returned to his house. It stopped from exhaustion.

The removal of **polypi** as I stated above, was commonly done with the forceps, at times also with the snare. I do not want to cite cases in confirmation of the remarks made before; one only may serve as an illustration.

A miner from the West had been suffering from otorrhœa in one ear for many years. Off and on he had been treated by different aurists, who "worked at his ear, pulling, cutting, crushing, burning, for months at a time." Finally he became disgusted and thought he would leave his ear alone. For more than a year he did nothing than syringing it when the discharge was annoying and offensive. At last, however, he had become totally deaf in that ear and had repeated attacks of severe headache. He had, therefore, decided, he said with an ironical smile, to "try Eastern medical talent."

I found the ear filled with a firm polypus, which, as I ascertained by probing, had a small attachment in the depth of the canal. I grasped the growth at its root with Hinton's forceps and drew it out entire at the first attempt, and so easily that the man on seeing it said to me: "It seems, sir, you have been in that pit before." I syringed the ear, found a large perforation of the *Mt*, the mucous membrane of the drum cavity swollen, but no secondary polypi. Treatment with boracic acid powder and alcohol reduced the swelling of mucous membrane to the normal, stopped the discharge, and re-established moderately good—$V \frac{20}{60}$—hearing. The patient returned home in a month with a perforated *Mt*, but no trace of a polypus.

The cases of **paracentesis of the Mt** furnish no opportunity for remarks of particular interest. In one where the inflammation had spread from the tympanic cavity over the osseous portion of the ear canal and the mastoid region, the paracentesis, liberating muco-pus, had to be supplemented by a deep incision, down to the bone, in the canal, as well as behind the ear, in the mastoid region. From both places pus was evacuated.

One of the two cases in which the **mastoid was opened,** is reported above; the other is reported in these ARCHIVES, vol. x, p. 365. It is the case in which I chiselled through a sclerosed mastoid process and opened the lateral sinus. I may here add that the patient is still doing well, pursuing her studies, and has been free from her previous distressing headache ever since the operation. The case in which the small *exostosis* was *chiselled off* is reported in the first part of this paper.

Operations reputed to improve hardness of hearing and cure noises, I mean paracentesis of a non-inflamed drum-head, division of the posterior folds, tenotomy of the tensor tympani, and the like, I have not done during the past few years.

TOTAL ABSENCE OF BOTH LABYRINTHS OF A DEAF-MUTE; WITH EMBRYOLOGICAL AND PHYSIOLOGICAL REMARKS.

By S. MOOS and H. STEINBRÜGGE, of Heidelberg.

Translated by H. Knapp.

We owe to the kindness of Dr. E. Fränkel, pathologist to the Hamburg Hospital, two petrous bones, removed, according to Schalle's method, from the body of a 35-year-old deaf-mute, who had died from consumption of the lungs, larynx, and intestines.

A general inspection of the specimen shows: Skeleton thin, almost child-like. Mastoid processes small, with well-developed pneumatic cavities. In the left ear-canal a plug of ear-wax. Right ear-canal large; drum-head normal.

Nasal passages and Highmore's antra normal. A spinous projection at the right side of the nasal septum. Uvula large and stiff, soft palate thick. Tonsils hard and tough, with numerous follicular depressions. Mouths of tubes apparently normal. A large quantity of rather fluid mucus escapes from the right pharyngeal orifice. Fibrous cords and mucus in Rosenmüller's fossæ. At vault of pharynx nothing abnormal. Tubes normal on inflation.

Macroscopic Appearance of Left Petrous Bone.

After removal of the plug of cerumen a small round perforation is noticed in the antero-superior quadrant, and an atrophic spot (cicatrix?), the size of a small pea, in the postero-inferior quadrant; hammer-anvil joint normally movable.

Long process of anvil and tensor tympani muscle united to the labyrinth wall by slender connective-tissue ligaments. An ordinary whale-bone probe passes readily through the osseous tube; the floor of the tympanic cavity is very flat, hyperostotic in the direction of the jugular fossa. The margin of the round window sharp; membr. secundaria not visible.

The roof of the tympanic cavity and mastoid antrum thinned. The region of the arched eminence flattened, and interrupted by a very deep furrow of the superior petrosal sinus.

The major and minor superficial petrosal nerves well developed.

Macroscopic Appearance of Right Petrous Bone.

At the roof of the tympanic cavity the same thinning as on the left side. Ossicles normal. The tendinous attachment of the tensor-tympani muscle at the neck of the hammer enlarged by fibrous tissue. The long process of the anvil likewise united to the labyrinth wall by a fine thread. Osseous tube well pervious. The entrance to the round window is directed more forward than backward, so that it can be looked into from in front. On this side also the osseous margin is sharp and somewhat notched.

Investigation of the Right Labyrinth.[1]

An oval, osseous nucleus, 6 *mm.* long, 3 *mm.* wide, was in front of the internal ear-canal. After the pyramid had been cut through vertically to its longitudinal axis—the section passing through the posterior third of the plate of the stirrup—*no space corresponding to the vestibule could be detected on either cut surface, nor was the calibre of a semicircular canal or an ampulla to be seen.* Nothing was seen but the smooth surface of the divided bone, colored green by the osmic acid. Upon this surface the above-mentioned yellow osseous nucleus, the facial nerve transversely cut and colored black by osmic acid, and a spot, 2 × 1 *mm.*, likewise darkened by osmium and situated close behind the plate of the stirrup, were distinctly marked. The microscopic examination of cross-sections, carried in the same direction, discovered in the last-mentioned spot a cavity filled with a network of delicate connective-tissue fibres and black globules of fat, evidently a rudiment of the vestibule which either had remained undeveloped or become *atrophied in the fœtal period.* In the upper part of this place the canaliculi of the branches of the vestibular nerve were clearly visible, and in teased preparations the normal structure of these nerve fibres could be ascertained.

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[1] The petrous bones having been sent in Müller's solution, were treated with 1-per-cent. solution of osmic acid for twenty-four hours, and decalcified according to the method mentioned several times before.

The structure of the plate of the stirrup was by no means uniform. The small posterior part was osseous; the larger anterior part, with the exception of an islet of cartilage, ligamentous. The orbicular ligament was distinctly recognizable in the osseous sections. The connective tissue of the ligamentous part of the plate was directly continuous with that which filled the rudiment of the vestibule. The edge and vicinity of the oval window was lined with cartilage. Numerous pseudo-ligaments were found between the limbs of the stapes and in the niches of the oval and round windows. In sections passing through more anterior portions the canaliculus of the cochlear branch leading to the frontal ampulla was seen, and contained nerve fibres, which, however, seemed to terminate in the bone tissue. In the same sections in which the membrane of the round window was visible, there was the beginning of a small canaliculus, which passed from the depth of the round window toward the interior, contained in its superficial portion some black globules of fat, and was probably the rudiment of a cochlear scala. It was lined with several layers of polygonal pavement epithelium, and led into two cavities, which in their anterior portions were separated by an osseous, in their posterior by a fibrous partition-wall, and lined with the same epithelium. One of these cavities was filled with a substance resembling coagulated lymph, and interspersed with numerous crystalline needles; in the wall of one of these cavities a spherical body was situated, with concentric layers and the same epithelium. Subsequent sections showed the two cavities united into one of biscuit-shape, which in the last sections completely disappeared. Apart from these meagre discoveries *no trace of a cochlea* was found. In the posterior (external) portion of the pyramid the above-described rudiment of a vestibule could be followed up, becoming smaller and smaller, in two or three sections; and above it the transversely cut canaliculi, with the nerve of the vestibular branch, were noticeable. They had evidently been destined to supply the ampullæ of the sagittal and horizontal semicircular canals. It was very surprising to find neither a trace of the ampullæ nor the semicircular canals, apart from a short osseous canaliculus running horizontally above the canal of the facial nerve, which might have been taken for a rudiment of the horizontal semicircular canal. We failed, however, to find the structure of a membranous semicircular canal in the corresponding canaliculus, which was filled only with delicate connective tissue.

Examination of Left Petrous Bone.

In the cut section of the pyramid, made in the same direction as on the right side, a similar osseous nucleus was seen, together with a rudimentary vestibular cavity of 3.5 *mm.* in height and 1.5 in width, and equal contents. Besides, there was a lymphatic, partially filled with fat, tinted black by osmium. The vestibular nerves also resembled those on the other side; pseudo-ligaments in the niches of both labyrinth windows. The membrane of the round window was complete; the inspection of sections showed, however, that immediately behind it (toward the cochlea) a second partition-wall appeared, which was osseous and barred the entrance of a small cavity filled with black globules (rudiment of the scala tympani).

The foot-plate of the stapes was ill-defined toward the orbicular ligament, for with the exception of a few scattered cartilage cells, it consisted entirely of connective tissue; a small bony islet was situated at a place corresponding topographically to the edge of the ligament.

A section of the posterior *limb of the stapes* showed also in this case[1] a slipper-shaped cone, whose bony rim was sharply defined from the remaining fibrous tissue. The centre of the *capitulum* contained a small osseous nucleus.

Some normal muscular fibres were within the pyramidal eminence.

No trace of semicircular canals, ampullæ, or cochleæ.

Condition of the Nerves.

The trabecles of the arachnoidal coat in the internal ear-canal contained an unusually large number of differently shaped concrements of phosphate of lime. Some trabecles were themselves petrified, and some concrements were situated in the walls of the vessels. Macroscopically, the facial and acoustic nerves, completely laid bare by chiselling open the canals as far as the hiatus of the Fallopian canal, showed nothing extraordinary, except that the acoustic nerve was somewhat thinned. The facial, examined in cross-sections, appeared divided into about ten smaller or thicker bundles by partition-walls formed from the interfascicular connective tissue; the single nerve fibres, microscopically examined, were, however, normal.

The acoustic nerve, treated as above mentioned with osmic acid, showed remarkable changes under the microscope. A portion of the nerve fibres and some ganglionic cells contained within the nerves appeared normal; another portion was replaced by connective tissue, and the contents, color, and configuration of its fibres were altered. While a part of the nerve fibres still exhibited the usual medullary appearance, others in their immediate neighborhood were scantily supplied or totally deprived of marrow. The reagent, consequently, colored some black, others pale gray, and others not at all, and their diameter was either normal or more or less reduced.

The very frequent occurrence of varicosities was especially conspicuous. Apart from a great number of normal, in particular normally wide fibres with many varicosities,

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[1] See our article on the combined occurrence of rachitic changes, and disturbances of development in the auditory organ of a crétin. These ARCHIVES, vol. xi, p. 1.

we found in teased preparations *an exceedingly great number of extremely small, medullaless, black or brownish-yellow fibres with numerous sinuosities.* Some nerves on account of the great number of varicosities had the appearance of rosaries.[1] Furthermore, a great number of isolated or aggregated round hyalin globules were seen.[2] The normal nerves, on teasing, were preserved in longer portions, whereas the varicose were broken into short segments. This condition is analogous to that found and described in nephritic, traumatic, or other forms of retinitis, further in the brain and spinal marrow when both the white and gray substances are affected, in the processes of the ganglionic cells, and in the axis-cylinders (Virchow, Hadlich, Roth); of late, also, in the axis-cylinders of a diseased abducens (Leber).

The modiolus and the cochlea, as we have already mentioned, were completely absent; the last twigs of the nerve, accompanied by a branch of the a. auditiva, penetrated a short distance into the bone, where they could no longer be followed.

From the preceding, it is evident that we had to deal with an atrophic process of the auditory nerve which, however, left one part of its fibres intact. The condition of the marrowless, varicose nerve-fibres must also be considered as the result of atrophy, because the morbid process destroyed the medullary substance but not the axis-cylinder. The reasons for regarding this condition as pathological are as follows: 1. The absence of changes in the adjacent facial nerve. 2. The uniform occurrence of the alterations in both acoustics. 3. The alternation of varicose nerve-fibres with normal medullary ones in some nerve-tracts. The occurrence of the varicosities might, perhaps, be considered as artificial; namely, as the effect of the osmic acid, but this would be at variance with the fact that the above-cited pathological condition was met with in other morbid processes without employment of osmic acid.

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[1] Much thinner than in the case of nerve atrophy in the first cochlear convolution, described by us before and illustrated with drawings. These ARCHIVES, vol. x. p. 1.

[2] Their pale, dull appearance, despite the application of osmic acid, excludes every suspicion of fat, confounding them with fat globules.

Physiological Explanation of the Nerve Atrophy.

We believe the atrophy was the result of inactivity. This supposition cannot be shaken by the fact that the whole nerve did not waste away, for a total atrophy from disuse has thus far not yet been observed in any organ, and its occurrence in our case would be surprising, as the nerve had remained in connection with the central organ and its own nutrient vessels.

The normal structure of the muscles in the tympanic cavity is not astonishing either. From theoretical reasons we might have anticipated to find them also partially atrophied by inactivity, provided that their functions be required only for acoustic purposes. This is, however, not the case, for they contract in association with other groups of muscles, being then innervated by the fifth pair and the facial. The tensor tympani muscle shows a concomitant action during deglutition; the stapedius muscle, during the contraction of certain muscles innervated by the facial, especially during the closure of the eyes. A normal structure of the tensor tympani muscle, in conformity with the reasons stated above, has been found by one of us in two deaf-mutes.[1]

Embryological Deductions.

The conditions just described confirm anew the supposition of an independent development of the different regions of the auditory organ: *the auditory vesicle only was disturbed in its development.* We leave it undecided whether the disturbance was the result of an original defective formation in the labyrinth vesicle, or of a premature total ossification of normal formations in consequence of early irritative processes.

The stapes deserves a special consideration. Its condition, described above, is at variance with the opinion of Parker, Gruber, and others, that the stapes develops from the labyrinth capsule through cellular proliferation. The result of our examination is rather in favor of the older supposition of its independent development from the second branchial arch.

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[1] Results of dissection of ear-patients, Cases 7, These ARCHIV., vol. iii and vii.

REPORT ON THE PROGRESS OF OTOLOGY FOR THE FIRST HALF OF THE YEAR 1882.

I.—NORMAL AND PATHOLOGICAL ANATOMY AND HISTOLOGY OF THE EAR.

By H. STEINBRÜGGE, Heidelberg.

Translated by Richard C. Brandeis, M.D., New York.

1. Hensen. Addendum to my remarks against the cupula terminalis (Lang). *Archiv für Anatomie und Physiologie*, Anatomical Department, 1881, No. 6.
2. I. Baratoux. Pathogeny of the diseases of the ear. Anatomo-histological part.
3. Lucae, Berlin. On hemorrhage and hemorrhagic inflammation of the labyrinth of children. *Virchow's Archiv*, vol. lxxxviii, 1882.
4. Hermann Krause, Vienna. Two *post-mortem* examinations of simple ozæna. *Virchow's Archiv*, vol. lxxxv, 1881.
5. Eugene Fränkel. Pathological contributions from the Hamburg Hospital. 1. On intestinal cysts. 2. Contributions to rhino-pathology. *Virchow's Archiv*, vol. lxxxvii, 1882.
6. Max. Schaeffer. Nasal polypi. From an address delivered before the Medical Society of Bremen. *Deutsche med. Wochenschrift*, No. 23, 1882.
7. E. Zuckerkandl. Normal and pathological anatomy of the nose and its pneumatic cavities. Vienna, 1882. Braumüller.
8. Vitus Graber. The chordotonal organs of special sense and the hearing of insects. *Archiv für microsc. Anatomie*, vol. xx, part 4, and vol. xxi, part 1.
9. A. Hannover. The primordial cartilage and its ossification in the human skull previous to birth. *Nord. med. Archiv*, vol. xiii, part 2 ; also *Lond. Med. Record*, 1882.

1. HENSEN summarizes the results of his examinations on the terminal filaments of the crista acustica and cupula terminalis (published in the same journal, 1878, pag. 486), and also reports new and very interesting observations which cannot well be condensed.

If we were to attempt to reconcile Hensen's views of the cupula with those of his opponents, we would have to proceed as follows: A distinct, organized structure, which might be termed the cupula terminalis, does not exist during life. We learn from the author, however, that upon the crests of the ampullæ, between the terminal filaments and in their immediate vicinity, there is a mass, which is chemically different from the rest of the endolymph, of a colloid nature, in a living or fresh condition transparent, and therefore not visible with a low power of the microscope. After being treated with nitric, chromic, or osmic acid, or with alcohol, this substance coagulates, and with the terminal filaments goes to make the peculiar, striated structure which Lang calls the cupula terminalis.

2. BARATOUX in the first chapter of his monograph gives us a clever review of the normal anatomical conditions of the labyrinth, which will afford the reader, who is already conversant with the histology of the labyrinth, a convenient résumé of all that is most worth knowing. By employing great brevity and conciseness, the author has been able to treat fully of the anatomy, embryology, and morphology of the labyrinth within a space of 37 octavo pages. This is the more surprising as not only the histology of the cochlea, the vestibule, the semicircular canals, the arteries, veins, lymphatics, and nerves of the ear are discussed, but we also have the sympathetic, the trigeminal, facial, glosso-pharyngeal, the nerve of Wrisberg, and the cervical plexus treated of in detail, while even the central origin of these nerves is also considered. As every one who concerns himself at all with the physiology and pathology of the ear must be familiar with all the elementary and gross anatomical facts given, we hardly deem it necessary to enter into an elaborate consideration of this part, but will merely discuss some of the points which are at variance with the views generally entertained.

Ranvier found two prolongations on Deiter's cells, of which one is supposed to attach itself to the lamina reticularis, and the other to the membrana basilaris. Besides this, Ranvier says that there is a depression on that side which Corti's cells touch.

These assertions, as well as the succeeding description of the spiral ganglion in the canal of Rosenthal and of the fibres of the cochlear nerves, probably refer to some specimens derived from one of the vertebrata. In the human cochlea the conditions, in part at least, do not correspond to the above description. The ganglionic cells of the human cochlea do not, as in dogs and squirrels, lie in one heap, thus forming a chain of ganglia passing through a spiral canal, but they are irregularly distributed in the cavities of the spongy tissue. We therefore cannot accept the author's assertion, that each one of the branches of the nerves which has passed into Rosenthal's canals represents "un renflement ganglionnaire."

In considering the vessels of the membrana tympani, the cellular tissue lying beneath the lower cells of the epidermal covering is termed a "couche muqueuse" while the real layer of mucous membrane is called a "lame muqueuse." According to Baratoux, the aqueductus vestibuli contains a branch of the middle meningeal artery; the aqueductus cochleæ, a branch of the internal carotid artery. In the section devoted to the consideration of the veins, he mentions Weber-Liel's correct assertion, viz., that there is a canal, running parallel with the aqueductus cochleæ, which extends to the scala tympani, and which evidently serves to transmit a vein. Under the subsection of the petrosal nerves, we find to our surprise, that the branch of the glosso-pharyngeal which is known as Jacobson's nerve, is called the nervous petrosus profundus; while another nerve, *i. e.*, the nervus petrosus superficialis minor, arising from the facial nerve, is also said to terminate in the otic ganglion.

3. LUCAE's case is entitled to especial consideration, because the *post-mortem* revealed to him a means of transmission of inflammatory processes from the meninges to the labyrinth which has, hitherto, failed to attract attention. By bearing this in mind we will henceforth be able to explain many of those cases of sudden deafness which are so often observed in children.

A boy, aged 3½ years, was affected with symptoms of a mild attack of cerebro-spinal meningitis. On the tenth day he had already begun to manifest signs of improvement, but the day after sudden deafness set in. During the three previous days the patient had complained of intense tinnitus. On examination it was found, that on the left side there was slight injection of the handle of the malleus; and on the right side, an old cicatrix in the posterior superior quadrant. Symptoms of meningitis, with strabismus, very soon returned. Lucae again examined the patient three weeks after the relapse began. He found great emaciation, insensibility, vomiting. About eight weeks after the illness first began, the case terminated fatally in consequence of what appeared to be a tuberculous basilar meningitis, although three days previous to this the patient appeared to be mending rapidly.

The *post-mortem*, which was limited to the skull and its contents, revealed a condition which pointed to internal hydrocephalus, with tendinous thickening of the pia mater at the base of the brain. Submiliary nodules were found along the course of the vessels of both fossae Sylvii.

The dura mater covering the petrous bone was of a reddish blue-green color. There was a reddish discoloration of the bone in the region of the posterior and superior semicircular canals. The osseous canals, especially the superior and posterior, were filled with recent dark-red coagula and fluid blood. The vestibules were also filled with blood ; the cochlea not so much so. Pus corpuscles were also found in the canals. The condition of the discolored, carious membranous parts of the labyrinth was similar to the above. The vessels of the lamina spiralis were greatly congested ; Corti's membranes, on both sides, enormously thickened ; no evidences of tubercles discoverable in the labyrinth.

Lucae refers again to the two periods of the disease, and, agreeing with Dr. Wernicke, who performed the autopsy, assumes that as the tubercular meningitis was progressing favorably, the fatal issue was probably due to a general miliary tuberculosis. We might, therefore, be justified in presuming that the first attack, which was diagnosticated as cerebro-spinal meningitis, might have been due to the tuberculous dyscrasia, if it were not explicitly stated that it presented all the features of an epidemic form of cerebro-spinal meningitis. It is surprising that there was no vertigo as well as deafness, which was undoubtedly due to the hemorrhages. Lang, who attributes it to "changes in the intra-cerebral pressure," when it appears in the course of a disease of the labyrinth, believes that there was no vertigo, because "owing to the meningitis (hydrocephalus internus) the pressure *was* lessened from the very beginning."

On examining more closely, however, Lang also found that a reduplication of the dura mater, richly supplied with vessels, extended into the hiatus subarcuatus. A further microscopic examination of sections of the very vascular bone, as well as of other sections which had been decalcified by means of a 10-per-cent. solution of hydro-chloric acid, verified the author's supposition that the inflammation had extended by this route from the brain to the labyrinth. The vicinity of the semicircular canals was filled with very large spaces containing marrow cells—blood and pus corpuscles, as well as a puro-sanguinolent fluid. The membranous labyrinth was so broken down that no microscopic sections could be made. The vestibular branch, as well as the ramus cochleæ, contained normal nerve-fibres. There was evidently an osteo-myelitic condition of the spongy substance enveloping the labyrinth, which was followed by a hemorrhagic inflammation of the membranous labyrinth. Lucae now proceeds to considei the question whether the marrow spaces described above, as found in the neighborhood of the semicircular canals, should be considered in children as normal or pathological developments. Henle, who had the question put to him, answered that he had found them in some petrous bones of children, but failed to do so in others, and that he did not think that they were of a pathological nature. We now have the results of another autopsy, made on a male infant, aged seven months, that died of a gastro-intestinal catarrh, complicated with a bilateral otitis media purulenta. In this case similar hyperæmias and bloody extravasations were found in the enormously enlarged marrow spaces of the spongy portion of the labyrinth, and also in the bony canals. Lucae doubts the probability that the extension of the inflammation was due to the vascular anastomoses between the mucous membrane of the tympanum and the labyrinth (first described by Politzer), and is inclined to attribute it to the vascular connection between the fissura petro-squamosa and the dura mater and from there to the labyrinth, by means of the vasa subarcuata. In a third case only a few narrow and elongated marrow spaces and hyperæmia of the bony and membranous semicircular canals were found.

Lucae ascribes to the spongy tissue surrounding the capsule of the labyrinth as well as to the vessels penetrating the petrous bone, an important rôle in the physiological nutrition of the labyrinth and its disturbances in early infancy.

4. Krause gives us the *post-mortem* appearances in two cases

of ozæna. In neither of these cases was the disease complicated by ulcerations or by any carious disease of the bone, but was simply due to pathological conditions which caused atrophy of the nasal mucous membrane. The first case was that of a man, aged 52 years, who died of cirrhosis of the liver; the other was a woman who died in consequence of chronic tuberculosis, Bright's disease, and diphtheria. Among the many interesting facts revealed by the microscopic examination of numerous sections taken from different portions of the turbinated bones, the most important are: Infiltration of the subepithelial layer, with innumerable round and spindle-shaped cells in a state of fatty degeneration; numerous accumulations of fat-granules, and larger and smaller globules. Beneath this layer there was organized, tough connective tissue. The adventitia of the arteries was thickened; the intima in folds; the venous spaces, with thickened coats, were tortuous, angular, and of narrow calibres. (The Reporter has noticed this condition in normal nasal mucous membranes, and has described it in vol. viii of these ARCHIVES.) The glands were partly atrophied and had, in part, disappeared altogether. In some specimens one could follow the migration of the oil globules from the lower portion of the mucous membrane to the surface. The bony portion of the turbinated bones was destroyed in parts. The whole mucous membrane lining the nasal cavity was more or less atrophied. The condition of the mucous membrane lining the adjacent cavities was similar to that already described, but not in so marked a degree. The crusts were composed of epithelium in a state of fatty degeneration, of oil globules and margarine crystals.

Krause has proved that a part of the cellular infiltration has been transformed into connective tissue, thereby promoting contraction, while the remainder degenerated into mere detritus.

The degeneration of the glands is not only due to the constriction exercised by the newly formed and contracting connective tissue, but also to the changes in the vascular supply and the disturbances of nutrition which ensued therefrom.

The conditions found in xerosis of the conjunctiva and in callous stricture of the urethra are quite similar. The question arises, whether the atrophy of the nasal mucous membrane may not occasionally be due to infection from a gonorrhœal ophthalmia.

Krause attributes the fœtor of ozæna to the degenerated cellular derivatives, which, undergoing fatty metamorphosis, rise to the surface, forming, with the detached epithelium, scabs and crusts, which soon become transformed into fatty acids. The diminished secretion, due to the changes in the vascular supply and the atrophy of the glandular structure, favors this state of affairs. The suspension of the chemical influence of the glandular secretion must also be borne in mind.

As affections of the adjacent cavities are not constant, and, even if present, the disease of the nasal mucous membrane is always paramount, Krause cannot accept Michel's theory.

The anosmia is due to the destruction of the olfactory cells. The pathologico-anatomical changes make it apparent that the mucous membrane cannot be fully restored to its normal condition. We can only hope for success if we are able to transform, by means of energetic cauterization, also the superficial layers of the mucous membrane into cicatricial tissue. A few cases in which the ozæna was cured are appended to the paper.

5. The second part of FRÄNKEL'S paper is devoted to contributions to rhino-pathology, more especially that form of rhinitis chronica atrophicansfœtida, which is now termed "simple ozæna." His more recent anatomical investigations as to the nature of this disease, conjoined with his clinical experience, tend to confirm him in his original views, which agree with those of other investigators. As far as the anatomical changes are concerned, we have a diminution in size of the turbinated bones, which entails a dilatation of the fossæ, a degeneration of the mucous membrane into a form of connective tissue, and an obliteration of its mucous membrane. The dilatation is the final issue of a rhinitis which first was hyperplastic, and later led on to atrophy. Thus Zaufal's theory, that the dilatation of the nasal passages was the predisposing cause of the ozæna, lacks authentication.

We next have the results of a *post-mortem* examination of a man, aged 45 years, dying of consumption, who had suffered from ozæna for many years before. The cavernous tissue of the inferior turbinated bones was entirely wanting. The epithelium of the very atrophic mucous membrane was intact, and there were no evidences of loss of substance whatsoever; on the other hand, it was completely infiltrated with small round cells, the glands could only be found in the respiratory region, while those in the olfactory region were almost entirely gone.

Fränkel acknowledges that the clinical and anatomical images do not quite harmonize, inasmuch as fœtor is sometimes noticed in the hypertrophic stage, that is, before atrophy sets in. It is possible, however, that at this time there may also be a disseminated atrophy which is not recognizable during life. It is questionable whether there need always be a period of hypertrophy, and whether the atrophy may not be primary.

In regard to the etiology, it may be said that five out of six cases of ozæna, in which *post-mortems* were made, were tuberculous ; and ozæna appears to be due, in part, to scrofula, but it is difficult to trace any relation between it and syphilis.

As far as the treatment is concerned, it must be borne in mind that the glands, when once destroyed, cannot be restored. When atrophy has once set in, a radical cure must be impossible. Fränkel recommends the use of Gottstein's tampons, as a palliative measure ; and not only because they stimulate an increased secretion, thus preventing incrustations, but also an account of the fact that they prevent the entrance of bacteria, and other foreign bodies floating in the atmosphere, into the nasal cavity. The mucous membrane which has undergone a pathological change, and whose secretion must be chemically altered, owing to the disappearance of the glands, is a very excellent breeding-place for bacteria, which contribute not a little to the intensity of the fœtor.

In conclusion, Fränkel gives us an exhaustive analysis of the case of tuberculous ostitis of the septum narium, which occurred in a little boy, five years of age, who had tuberculosis of the neck of the right femur. This case has already been reported in volume x of this journal.

The *post-mortem* showed that the tuberculous infiltration of the mucous membrane of the left side of the septum was only a secondary result.

6. Schaeffer tabulates 120 cases of nasal growths. Of these, 102 were mucous polypi, 7 teleangiectatic tumors, 8 fibromata, and 3 carcinomata. They were found in 76 males and 44 females, and were most common between the ages of 30 to 40 years.

Schaeffer removed a number of mucous polypi which were situated on the floor and the vault of the nasal cavity, and also several which arose from the septum. He refers to Billroth's treatise for a description of the minute structure of these growths.

7. Zuckerkandl's monograph not only includes all his previous contributions on the subject (see *Med. Jahrb.*, 1880, and

Wien. med. Zeit., 1881, No. 9), but also his more recent investigations, which consider the minutest details of the macroscopic normal as well as the pathological anatomy of the nasal region. Anatomists, surgeons, and rhinologists owe thanks to the author for publishing this exhaustive work, which is based on the examination of no less than 300 cases. The monograph is profusely illustrated.

As we have already reviewed the author's previous contributions to the physiology and pathological anatomy of the nasal cavity and its pneumatic adnexæ, we will, on this occasion, only call attention to the more novel facts which he has given us. Among the first of these is a summary of the views of the older anatomists as to the contents and appearance of the cavities connected with the nose. These were generally supposed to be filled with a medullary mass, or with mucus; while, on the other hand, Riolan, Highmore, and especially C. Schneider, already recognized the fact that they were only pneumatic cavities. Many years elapsed before these views began to prevail generally, and even in recent times there were some anatomists who taught that the physiological function of these cavities was to secrete mucus. Zuckerkandl states positively that in health no mucus is found in these parts. The most marvellous views were current as to the physiological importance of these cavities; they were supposed to generate the spiritus animalis from the atmospheric air, to purify the inspired air, to absorb mucus from the cerebral ventricles, to increase the sonority of the voice; and last, but not least, to act as accessory to the olfactory organ. In reference to the last theory, Zuckerkandl refers to the experiments of Dechamps, Richeraud, and Hyrtl, and calls attention to the fact that no branch of the olfactory nerve is discoverable either in the adjacent cavities or the ethmoidal cells; thus all perception of smell is rendered impossible.

In reference to the method of preparing the sections of the head, sagittal and frontal sections are recommended, and the author advises us to begin with a sagittal division. Where it is desirable to obviate any mutilation of the body, Schalle's method is recommended. In the description of the anatomy of the nasal cavity many features which are not quite normal are described. Among those not so well known we have, for instance, one of the constant bilateral deviation of the middle turbinated bone to the same side, by means of which the olfactory fissure is considerably enlarged. Furrows, incisuræ, and indications of a division, such as are often found in the superior bone, are occasionally noticed in the middle turbinated. The external wall of the nasal cavity is more fully described, because, aside from numerous differences in contour, it contains the sinuses leading into the maxillary and frontal cavities. The relations of the processus uncinatus, as well as that attachment of the ethmoid which he terms the *bulla ethmoidalis*, between which we find the orifice of the hiatus semilunaris, we know already from his previous writings. The hiatus contains the foramina of the antrum of Highmore, and of the sphenoidal cells, which are also in communication with the ethmoid bone. Its anterior end, the infundibulum, leads to the frontal sinus. In addition to the above the openings of other foramina are found on the outer wall, but these are generally covered, during life, by mucous membrane. Their shape and number depend on certain variations in the shape of the processus uncinatus.

In respect to the septum narium, attention is called to the frequent persistence of the cartilage, which is found in the newly born between the two plates of bone, and the increased thickness of the septum in the respiratory region. This is due to an intumescence of the mucous membrane. Among 370 bodies, Zuckerkandl found deviations of the septum in 140 instances; they appear to be less frequent in those not of European birth. The deviations are generally only found in the anterior two thirds of the septum. A hook-shaped process is sometimes developed from the remains of the cartilages (107 times in 370 European heads). This is also less frequently found in non-Europeans.

No branches of the olfactory nerve are to be found on the lateral surfaces of the middle and superior turbinated bones. The respiratory surface is greater than the frontal. The expired air cannot easily enter into the olfactory region, owing to the dependent position of the sphenoid bone and the prominence of the middle turbinated. When the breath is tainted the patient himself is often not aware of the fact. On the other hand, the horizontal plane of the openings of the nostrils allows the inspired air to enter the olfactory region, so that all odors can be perceived. That this is so is proven in those cases in which disease has caused a depression of the cartilages of the nose so that the nostrils look out vertically, the inspired air passes, through the respiratory tract, directly into the nasal fossæ, without any distinct sense of smell.

Of the diseases of the nasal cavity we have descriptions of inflammatory processes, of polypi, true atrophy of the turbinated bones, synechiæ, perforations and fractures of the septum, and of mucous cysts.

Polypi are divided into five groups: 1, hypertrophy of mucous membrane; 2, true polypi with broad or narrow pedicles; 3, small warty growths; 4, polypoid granulations; and 5, papillomata.

The majority of these arise from the superior turbinated, from the margin of the hiatus semilunaris, the borders of the ethmoidal foramen, the infundibulum, and the middle and superior meatus. They were never found to arise from the superior or inferior nasal surface, nor from the inferior turbinated bone (compare M. Schaeffer to the contrary). Polypi situated in the cavity of the infundibulum, or near the opening of the maxillary, sphenoidal, or ethmoidal sinuses, cannot be grasped at their base by any snare, so as to be radically cured. We must, therefore, be prepared for relapses, although these may not be very frequent.

We now have a consideration of the influence which these growths exert upon the nasal cavity and its contents; to which is added a section on the true atrophy of the turbinated bones and its etiology. Zuckerkandl does not believe in congenital atrophy. He agrees with those who consider this process as the result of a chronic blenorrhœa, and who think that hypertrophy must always pre-exist. Whether the adjacent cavities are also involved or not, is a matter of indifference.

Attention is next called to the synechiæ between the turbinated bones and the walls of the nasal cavity, which may be congenital as well as acquired; also perforations of the cartilaginous septum (8 times in 150 cases), and next cysts of the mucous membrane.

Another chapter treats of the anatomy and pathology of the pneumatic cavities, beginning with the maxillary sinus, its dilatations and contractions. Atresia of the maxillary antrum is very common; Zuckerkandl having found it in 56% of all cases, and in 25% it was in connection with asymmetry of the face. This cavity may also be divided into two parts, one above the other, and each having sinuses passing into the nasal passage. Besides the prominences of the alveoli and bony projections, the dental nerves are sometimes visible on the inner surface, which, owing to a deficiency of their bony canals, may be in immediate contact with the mucous membrane, and, when this is diseased, give rise to neuralgias. In health, the mucous membrane is plicated and contains acinous and tubular glands ; in the embryo and new-born it is so much swollen that, instead of a cavity, only a fissure, lined with epithelium and mucus, is visible. The mucous membrane is separated from the bone by a delicate periosteum.

The chapter " On the pathology of the maxillary sinus" opens with a consideration of the inflammatory processes of its lining, which generally extend from the nasal cavity. In some cases disease of the bone or of the teeth may be the predisposing cause ; catarrh, both mucous and purulent, and also diphtheria occur.

In chronic catarrh the periosteal layer is involved, and becomes greatly thickened in consequence of serous infiltration.

In diphtheria no membranes are found, but the mucous membrane swells and becomes ecchymosed and œdematous. Zuckerkandl also assumes that closure of the sinus may cause absorption of air contained in the cavity and an exudation *ex vacuo.*

If it is necessary to trephine the antrum it is best to perforate the inner wall just below the infundibulum. Small flakes of bone are often found as the residua of inflammation ; these are sometimes embedded in the lining membrane, and thus explain the existence of movable bony growths in the maxilla.

We also have, among the tumors of the maxilla, osteomata, fibromata, polypi, and cystst of he mucou smembrane. The etiology of the latter is still in doubt ; and most authors agree that they are dependent upon disorders of dentition and deformities of the teeth. An ossified fibroma was found in the left antrum ; this was enclosed in a bony envelope and did not cause any visible disfigurement. This fact is of diagnostic value, inasmuch as these growths by pressing upon the infra-orbital nerve may cause facial neuralgia.

We next find the anatomy of the frontal sinuses, their variations in size as well as total absence. Z. does not agree with Steiner that these are formed from the ethmoidal cells. The canal leading to the frontal sinuses is situated in the anterior part of the infundibulum ; another between the process of the anterior end of the middle turbinated and the processus uncinatus or one of the ethmoidal cells.

Among the pathological conditions we first find inflammations, the results of pre-existing disease of the mucous membrane of the nasal cavity. Catarrhal diseases are either simple or purulent. Owing to their position any exudations which may collect in these cavities can be easily evacuated. We also have perforations, which are either congenital or due to atrophy ; osseous growths, and cysts.

The sphenoidal cavities vary greatly in size. They may be excessively large or very small. The sphenoidal sinus terminates in a special fissure just beneath the vault of the nose. Its diseases are the same as those of the other cavities. Among the most interesting of the anomalies of the ethmoid bone is the gaping of the lamina papyracea, with opening of the ethmoid cells into the orbit, as this may give rise to an emphysema of this cavity.

8. Graber has recorded the results of his investigations of the auditory organ of insects in an exhaustive monograph.

He terms certain terminal portions of nerves which are found in different parts of the trunk (truncal) and on the limbs (membral) the chordotonal organs. They contain peculiar nerve terminations called scolopes (σϰόλοπες, *i. e.*, styles or thorns) from which the term scolopophorous organs is derived. Besides the filamentous organs they are also found in the "tympanal apparatus" of many insects, where they were first found by v. Siebold, in 1844, in the orthoptera, and later by Leydig in other classes of insects. Graber divides them into poriferous and primitive, according to the parts of the integument under which they are situated, and whether or not they are possessed of pores. Thus there is a threefold possibility of perceiving sounds.

Graber's investigations were made on the youngest, living larvæ, with a high microscopic power, and concern first the structure, then the distribution, and lastly the morphology of the different chordotonal organs. These fibres are small conical bodies, pointed on their proximal and blunted on their distal ends, and hollow within. They are composed of a homogeneous, highly refractive bluish substance, very tough and elastic, and adherent to the chitinous cuticle. The shape of the head varies greatly in different insects, some being pear-shaped, others cylindrical ; and it is traversed throughout its entire length by a canal containing a granular mass which is probably connected with the chorda. This is probably the axis-cylinder, which originates in the ganglionic cells.

The scolopophora are tubular terminations of the chordotonal nerves, which surround the fibres, and passing over their club-shaped ends terminate in a tube which is attached to the integument. This tube, besides a granular mass, contains spindle-shaped nucleated corpuscles. They vary in length, the longest being five times as great as the shortest.

The scolopophora are rarely monoscolopic, but generally polyscolopic, and the greatest number are found in the tympanal and poriferous structures. The number of fasciculi on the tympanal organs of the acridia was more than one hundred, while those on the poriferous organs were often more than two hundred.

When the cords, as may happen, instead of running straight along are curved at right angles, we find a new structure, the so-called chordotonal ligament. This arises from the apex of the angle of curvature, and represents a prolongation of the afferent branch : thus T, and the scolopophorous cord is kept tense in spite of the angular curvature.

The chordotonal organs are always situated between two immovable points of the integument. Moreover, the filaments are always limited to a segment of the trunk and limbs, and never cross the intervening spaces.

Graber has found these organs not only in the orthoptera, coleoptera, and diptera, but also in the pseudoneuroptera, neuroptera, lepidoptera, and in the rhynchota.

With the exception of the mandibles, maxillæ and anterior wings, the membranal chordotonal organs are found in all parts of the head and trunk.

In the physiological part, Graber discusses the question, whether insects respond to sound-waves or not. His experience leads him to a positive conclusion with regard to insects which live in water and such as live in the air. As soon as they were exposed to noises they endeavored to escape, particularly if the tones were of a high pitch.

The assertion that the movements of insects after exposure to sounds are only reflex is disproved by the fact that they become gradually accustomed to them, and always react less and less ; and again, in musical grasshoppers their sounds attract those of the opposite sex.

In respect to the question, whether there is really hearing or only a kind of touch or feeling, Graber says, that the differentiation of the entire system of special sense would be of little value if it were not accompanied with the ability to distinguish between different sensations. As insects are undoubtedly able to distinguish differences in pitch, it is very probable that this is accomplished by the sense of hearing, and not that of touch. He has proven that insects possess several organs of hearing, by destroying the tympanal organs in crickets without impairing their ability to perceive sounds.

As far as the function of the poriferous and primitive chordotonal organs is concerned, Graber believes that these are also of an acoustic nature.

By experimenting on decapitated insects he has found that the central organ of hearing is not located in the head alone, but may also be found in the abdominal cavity. The extra-cephalic situation of the chordotonal organ cannot be taken as an evidence that it is not an organ of hearing.

9. HANNOVER has studied the development of the human skull on 25 embryos varying from two to eight months. His results are as follow: The occipital, temporal, sphenoid, and ethmoid bones, the inferior turbinated bones, and ossicula auditûs, are developed from the primordial cartilage. The process of ossification does not take place by the metamorphosis of the cartilage cells, but by means of the periosteum. All of the ossicula auditûs are developed as a continuous cartilaginous mass from the walls of the labyrinth. As far as their ossification is concerned, his view is in direct opposition to that generally entertained.

II.—PHYSIOLOGY OF THE ORGAN OF HEARING AND PHYSIOLOGICAL ACOUSTICS.

BY OSCAR WOLF, OF FRANKFORT-ON-THE-MAIN.

Translated by WILLIAM C. AYRES, M.D., New York.

1. Dr. J. KESSEL. (*a*) On the function of the auricle in the perception of space. (*b*) On the difference of the intensity of a linear-excited sound in different directions. (*c*) On the hearing of tones and noises. *Archiv f. Ohrenh.*, vol. xviii, H. 3, pp. 120–151.

2. Dr. HESSLER. Contribution to the physiology of the ear. *Ibidem*, vol. xviii, H. 4, p. 227–272.

3. W. KIESELBACH. On the function of the semicircular canals. *Ibid.*, vol. xviii, H. 3, p. 152–156.

4. Dr. J. Baratoux. Élève du laboratoire des hautes-études et du laboratoire de physiologie de la faculté de médecine de Paris : Pathogénie des affections de l' oreille, éclairée par l' étude expérimentale. Paris, chez Adrien Delahaye et E. Lecrosnier, 1881, 118 pag.

5. Dr. V. Urbantschitsch. On subjective variations in the intensity of acoustic perceptions. *Pflüger's Archiv*, vol. xvii, pp. 436–453.

6. Dr. W. Kirchner. Contribution to the knowledge of the circulation and secretion in the tympanic cavity.

7. Dr. W. Kirchner. On the influence of the trigeminus on the ear.

8. W. Bechteren. The importance of the infundibular region of the third ventricle in the maintenance of the equilibrium of the body. Preliminary contribution from the clinic of Prof. Mierszejewski (after a communication made at the meeting of the Psychiatrical Society, in which the animals operated on, and the preparations of the brains, on which the operations had been previously performed, were exhibited). *Petersburger med. Wochenschr.*, No. 12, 1882. (Reviewed by H. Steinbrügge.)

1. (*a*) *On the function of the auricle in the perception of space.*

Contrary to the opinion of Hensen,[1] that the auricle has but little influence on hearing, Kessel has examined its function and come to the conclusion that it is of importance, especially in determining the perception of space. He further points out that the ear is capable of appreciating the smallest variations in the intensity of sound, and still the sound will be referred to the side of the stronger excited ear, if both ears are excited at the same time. In order to determine what part the auricle plays in the determination of the direction of sound, Kessel uses various instruments (large tuning-forks, the watch, and steam-inhalation apparatus). If one ear is closed, and the instrument held in front of the open ear, and first moved forward and then backward in the direction of the median axis of the skull, and then in the direction of the axis of the external canal, in each case carying it so far that the tone can just be heard, it is found that the distance from the ear is greater in the first direction than in the second, and greatest of all in the third. Therefore the sound is heard better in the direction of the axis of the external canal. If the auricle is pressed against the head, the distance at which the same sound is heard will increase behind and decrease in front. If the hollow of the hand be placed against the auricle, the above relation is reversed. In both conditions the hearing-distance remains the same in the direction of the axis of the canal. (These facts were known before. See Politzer's "Manual of Otology," pag. 65.—Reviewer.) Kessel then determines five auditory regions by his experiments, which are characterized by the fact that, when the head is kept still, a sound reaches the ear in different intensities, or, when the head is moved, produces different grades in the change of intensity. The anterior auditory region extends from the median axis to the tragus ; the middle or direct, from the edge of the tragus to the posterior edge of the auricle ; the posterior, from the last-mentioned locality to the prolongation of the median axis backward. The inferior extends from the downward prolongation of the vertical axis of the skull up to the lower wall of the external canal ; the superior, from the upper wall of the canal up to the vertical axis. The certainty in the *perception of space* depends, however, on the combined action of the eye and ear, and on the motions of the head and body in directing them toward the source of sound. For the proper understanding of these experiments, the reviewer thinks it necessary to study the elevations and depressions of the auricle, according to mathematical and physical laws as to the reflection of sound-waves, since they probably would form essential boundaries to the above auditory regions.

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[1] "Manual of Physiology," Herrmann, vol. ii, p. 24.

(*b*) *On the difference in intensity of a linear-excited sound in different directions.*

In these experiments the author treats of a phenomenon of bone-conduction which was first called attention to by Lucae. If a tuning-fork be placed laterally on a parietal bone, and both ears stopped up, it is heard almost alone by the opposite ear. Later observations by Tröltsch and Urbantschitsch confirm this, and also state that if the ears are left open, the perception is sometimes on the opposite side. Kessel also states that if the tuning-fork is placed perpendicular on one half of the (upper ?—Rev.) maxillary bone it is heard, not in the ear of the same side, but in that of the opposite side. He then reports the results of a series of ingenious experiments to determine a physical cause for this phenomenon. He comes to the conclusion that the tone of a tuning-fork is heard much better in the direction of the prolongation of the handle than in a direction perpendicular to this. He then goes into the transmission of such a sound in gas, water, wood, and animal tissues.[1]

For the power of transmission of the various tissues of the skull the following order was established: bone, connective tissue, muscular, glandular, and brain. Accordingly, brain tissue is the worst conductor, and could, therefore, have but little influence in the above phenomenon. If the skull was freed from its brain contents, and the tuning-fork placed on the glabella, its tone was stronger than when placed on the temple.

(*c*) *On the hearing of tones and noises.*

On account of the experiments of Helmholtz on the analysis of sounds, the physical properties of noises and the physiological processes in their perception have been neglected. Kessel remarks that this neglect is particularly conspicuous in the analysis of subjective sensations in diseases of the ear. After a series of experiments he comes to the conclusion that in the perception of noises the same conditions are present as in that of tones. The pitch of a noise can also be determined. For instance, if we gently blow small whistles with movable pistons, a noise is produced which has a recognizable pitch, changing with the movements of the piston. If we blow harder, a tone will be produced whose pitch will almost correspond to that of the noise, so that from the pitch of the noise we can know what the tone will be beforehand.[2]

Kessel then states further, that if noises are produced together with tones, they can both be perceived by the ear at the same time. By so adjusting their strengths, the two kinds of sounds can be so arranged that they are heard simultaneously. If this relation be then changed, the two sounds so influence each other that the stronger overcomes or does away with the weaker. There is, however, a remarkable condition, that the three lower octaves, from C^{-3} to c^0, are relatively much easier destroyed than the higher ones. The reviewer cannot agree with the author in the explanation of this observation. The lower tones are not destroyed when they are produced with a large apparatus. In determining the lower tone-limit, Preyer uses two large tuning-forks: one, 1 metre; the other, 0.7 *m.* in length, placed on resonators.[1]

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[1] For this purpose an electro-magnetic tuning-fork was used, on whose handle a small cylindrical wooden rod was attached. A second rod of the same size communicated with one tube of a triple otoscope. If both tubes are placed in the ears, and a piece of animal tissue of the same thickness as that of the two fir rods inserted between these rods, so that a direct communication be made between the electro-magnetic tuning-fork and the ears of the observer, the intensity of transmission in the communicating piece can be determined.

[2] Reviewer would here remark, that already in 1871, when determining the pitch of the consonants, he substantiated the opinion that the so-called noises which, among others, impart also their characteristics to several consonants, may be defined as a simultaneous sounding of a number of very high tones, which are close together in the musical scale, but in inharmonious relation to one another.

A fundamental tone, which governs the pitch of noises, can be determined partly by resonators and partly by the ear alone. On this principle the reviewer constructed his scale of pitch for the human voice. See "Speech and Ear," p. 70.

Kessel then discusses the hearing of tones and noises under changes of pressure in the external canal. He finds that an increase of pressure by 10 *mm.* of mercury causes a reduction of the whole range of audition, which is most marked at its lower limit.

Tuning-forks of 32–64 vibrations are quenched, and one of 128 is still more influenced. Very high tones of 12,000–16,000 are not perceived under this pressure, while those between are not abolished. In a diminution of pressure in the external canal of 10 *mm.*, the tones from the lowest limit up to c^4 are less intense, whereas those from this up to the highest limit of hearing are very much more intense. All noises are also diminished by diminution of pressure as above. (Probably from the reason that they are made up of very high unharmonic over-tones.—Reviewer.)

Kessel then goes into the observation of the vibration of the different quadrants of the drum membrane under increased and diminished pressure and their response to tones, and comes to the conclusion that the different parts of this membrane, as the radial fibres, must have an independent relation to sound, in so far that the shortest fibres in the superior part of the anterior segment and in its upper division vibrate with the highest tones, and the longest fibres of the posterior segment with the lowest tones (? Rev.); that noises are received by the upper part of the posterior segment and the third sector. There must also be a place in the posterior segment where the lowest tones and noises greatly interfere with each other.

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[1] In order to show that very deep tones, produced in sufficient volume, are not destroyed by high and loud noises, we need only observe large locomotive engines. The deep tones which they produce when they put into vibration the large resonating chamber of the tender are so powerful, that they are not only not overcome by the noise of the rest of the machinery, but produce upon the ear a very uncomfortable sensation. On the other hand, it has often been pointed out that the ear is especially sensitive for the higher and highest tones of the scale.

He explains in this way the fact that in increased pressure the higher tones are relatively but little influenced, since the higher tones are by far more easily conducted by the bones of the head *than the lower.*[1] In this way the influence which the drum-membrane exerts will be less perceptible.

2. HESSLER in his present paper very felicitously discusses many physiological questions as to the conduction of sound. First of all he endeavors to clear up the difference between Hensen[2] and Rinne.[3] Hessler confirms Rinne's observation, that the conduction of tones through the bones of the skull, which are produced by vibrations of a solid body placed on the skull, is inferior to the natural conduction through the air, drum-membrane, etc., and then presents a series of experiments to determine the relative length of time a tone can be heard from different points of the bones of the head. He confirms the observation, that the higher the tone so much the more is the bone-conduction of it inferior to that of air.[4]

The tone c^0 is heard 13–15 seconds longer by air-conduction than by the teeth ; and when the base of the tuning-fork is held directly at the canal it is heard 23–25 seconds longer : the tone c^1 is heard 65–67 seconds longer by air-conduction than by the teeth ; the tone c^2 55–60 seconds longer ; c^3 33–35 seconds longer. It is here to be remembered that when struck equally the lengths of vibration of the forks c^1 and c^2 are almost equal, while those of c^0 and c^3 are about $\frac{1}{3}$ as long as c^1 and c^2.

As to the sound-conduction of other parts of the skull, the tone c^0 is heard 12–13 seconds longer through the teeth than from the vertex ; and c^1, 30–35 seconds longer.

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[1] Kessel speaks more extensively on the direct bone-conduction and on the so-called indirect cranio-tympanic or air-conduction, in another place. When he says that in closure of the external canal the tones of tuning-forks from C^{-3} to c^0 are not conveyed to the labyrinth by air conduction, while those of over 4,000 vibrations are heard much easier, he stands in direct opposition to Hessler. See this page No. 2. The difference in the opinions of the two authors probably results from the fact that Kessel speaks of the bone-conduction of sounds by closed canals, while the sound of a tuning-fork which vibrates close to the ear, is carried to the drum-membrane by the auricle, and this cannot be considered as bone-conduction. Even when the external canal is closed there always remains a certain quantity of air before the drum-membrane, which could impart vibrations to the drum-head, which it (the air) had received from the cartilage of the canal.

[2] "Physiologie von Herrmann," vol. iii, 2, p. 26.

[3] *Prager Vierteljahrschrift*, vol. i, 1855, p. 72.

[4] That this opinion is antagonistic to that of Kessel has already been observed.

Hessler further confirms the opinion of Urbantschitsch, that variations are perceived in sounds of the lowest intensity, and that the respiration and pulse movements have not the least influence on this phenomenon of hearing.

Finally, Hessler discusses the doctrine of Helmholtz in his "mechanism of the ossicles," and the origin of the so-called clattering or jarring sounds (Klirrtöne). According to the latter author, this clattering is produced by the ratchets of the hammer-anvil joint. Politzer considers it as coming from the membranes and ligaments of the ossicles. Hessler then relates experiments to show that it owes its origin to the difference in the amplitude of vibration between the two prongs of the tuning-fork. That prong which is struck with the percussion-hammer must at first make greater vibrations than the other. It is after this difference has been corrected that the clattering disappears, and the true tone comes out. The interesting proof of this must be read in the original. The reviewer will here remark that Hessler and others have observed, that patients who have a hammer-anvil defect, and in whom there can be no possible striking together of the ratchets of the hammer-anvil joint, still hear the clattering.

3. KIESELBACH cut the semicircular canals in two large carps, in order to see if these fishes showed any disturbance of equilibrium. Only one of them made a rotation around the long axis of his body. K. thought that this was caused by a loss of blood from the operation.

4. BARATOUX's little work recommends itself so much the more to our notice as it contains all the recent German literature, a fact which, we are sorry to say, is rare with French authors. Even when the author's discussion of certain observations—which he declares as physiological facts—is but little beyond the limits of hypothesis, we, however, recognize that his work has a solid foundation. His vivid and attractive style, too, makes a pleasant impression. As he says in the introduction, experiments on animals should hold the most important place in studying the pathological conditions of the ear, creating, as it were, an experimental pathology of the ear,—an idea which should be well received from a physiological stand-point. The author has many excellent experimental physiologists among his countrymen, and he seems to have well employed their methods. The names of Magendie, Flourens, Béclard, Longet, Cl. Bernard, Vulpian, Mathias Duval, Ranvier, etc., appear often. The first part of the

work is devoted to the most recent literature of the anatomy and development of the ear, and a chapter on the physiological study of the function of the inner ear closes the anatomical part.

The *second part* is devoted to experimental study of lesions of certain nerves, whereby we can observe their effects on the middle and inner ears. The experiments are more particularly on the sympathetic, trigeminus, and the medulla oblongata. In the *third part* he compares certain morbid processes which seem to be in harmony with the physiological facts brought out in the second part, but states that he has not the pretension of having done justice to this extensive and intricate subject.

First chapter : Anatomy, morphology, embryology. The second chapter of the first part is entitled, " Physiologie appliquée à l' oreille interne," and principally treats of the function of the semicircular canals, and the organ of Corti (membrana basilaris). After criticising the extensive literature on the so-called *sense of space* which was called forth by the publications of Flourens, Baratoux comes to the conclusion that the two branches of the acoustic nerve (ramus cochleæ and r. vestibuli) have entirely different physiological functions : the first he calls the "nerf auditif" ; and the second, " nerf de l' espace." The semicircular canals are the peripheric organs for the equilibrium of the body, with the centre in the cerebellum. As a proof of this he cites the experiments of Gellé. Gellé perforated both cochleæ in a guinea-pig, which resulted in absolute deafness of the animal, but did not affect his equilibrium. He also cites the case of persons born deaf but who never experience any disturbance of equilibrium. On *post-mortem* examinations these people do not show pathological conditions in the semicircular canals, but the cochleæ exhibit very extensive ones, especially atrophy of the nerve fibres, and irregularities in the teeth of the first row. (The drawing seems to be very schematic and does not carry conviction with it.—Rev.) Baratoux does not give any thing new on the theory of co-vibration and the analysis of sound by the organ of Corti, but reports on what has been done by Helmholtz, Hasse, Hensen, Jendrassik, and others.

The first chapter of the second part is entitled : " Étude expérimentale de l' influence des lésions des nerfs grand sympathique et trijumeau, et du bulbe rachidien sur la determination de certains affections de l' oreille."

Section or irritation of the superior cervical ganglia of the sympathetic causes a narrowing of the pupil, and a sinking of the eyeball into the orbit, an increase in the blood circulation, and a rise of temperature on the corresponding side; while an electric excitation of the upper end of the cut cervical ganglia causes a dilatation of the pupil, and retardation of the blood circulation, and a paleness of the organs before very red, and also a fall of temperature.

In order to show the effect of such a section on the middle ear, B. performs the section on rabbits according to Cl. Bernard. The narrowing of the pupil, dilatation of blood-vessels, and elevation of temperature on the wounded side lasts a long time, but B. could not notice the hypertrophy of the auricle as described by *Bidder*. In other animals which were killed after some days, B. found *great congestion of the lining of the middle ear* with dilatation of the blood-vessels, which could also be easily observed in the semicircular canals. In animals which had lived for several weeks after the operation, he found an exaggeration of these symptoms even to a pronounced inflammation with pus formation and a hypertrophic condition of the lining of the tympanic cavity. Some of the animals lived five years after being operated on. The accompanying drawings of the middle-ear changes are very clear and convincing. He concludes that inflammation in the middle ear develops much slower after section of the cervical ganglia of the sympathetic, than after section of the trigeminus. By cutting the trigeminus inside of the skull, he was able to substantiate Gellé's results,[1] which were opposed by Hagen: He shows that much greater changes (such as suppuration and destruction of the parts of the tympanic apparatus) occur in the middle ear than after wounds of the sympathetic, and believes the cause of it is, that the trigeminus sends more vasomotor or trophic fibres to the ear than the sympathetic. On this account there is a much greater disturbance to the nutrition of the tympanic cavity after section of this nerve, than after division of the sympathetic.

Finally, he considers that there is a vasomotor centre in the medulla, which is located between the nuclei of the ascending roots of the trigeminus and the first cervical pair. (For this belief he does not furnish sufficient proof.—Rev.)

When this part of the cord is wounded, a dilatation of blood-vessels rapidly takes place on the same side. In some cases Baratoux found hemorrhages in the cochlea, and suppurative otitis media.

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[1] Compare the reviews in these ARCHIVES. Baratoux believes that the difference between these two authors comes from the fact that the animals operated on by Hagen did not live long enough after the operation in order to allow the changes in the middle ear to develop.

5. As a continuation of his experiments on the increase and decrease of acoustic perceptions,[1] URBANTSCHITSCH furnishes observations on "subjective changes in the intensity of acoustic sensations." They were made on persons who were hard of hearing, and compared with the same observations on the normal ear. The tones of the forks *C*, *D* sharp, *c*, *d* sharp were conveyed to both ears simultaneously by means of a three-limbed tube. U. determines that the variation in the hearing of a sound of small intensity, which he had explained before as a phenomenon of fatigue, is not entirely due to the tiring of the ear, but is in part a peculiarity of the acoustic sense. In the beginning of the experiment, with very weak sounds, this phenomenon is present, and therefore cannot result from aural fatigue. In physiological variations of hearing he also finds that sometimes in the middle of a hearing test, there is a very strong subjective sound-sensation, which was not heard in the beginning. Especially in people who hear badly, it may happen that in the beginning they may not hear the tone of a certain tuning-fork, even when struck hard; whereas, after a repetition of the experiment, the same tone may be distinctly heard, even when not struck hard. Accordingly, it seems that the ear increases in sensibility after repeated irritations, so that a momentary irritation which was not heard may be perceived after frequent repetitions of the sound. It also happens that the tones of tuning-forks (for instance, high ones) are heard after repeated irritation, whereas they were not heard before. U. could also show similar changes of sensibility in other organs of special sense.

6. & 7. KIRCHNER gives a complete representation of the experiments which were briefly communicated in the *Monatsschrift f. Ohrenheilk.* Kirchner's method of opening the bulla ossea, exposing and cutting the third branch of the trigeminus just after its exit from the skull into the anterior part of the tympanic cavity, has the advantage over other methods (cutting the trigeminus in front of the gang. Gasseri in the interior), that it makes a relatively less trauma (chloroform and curari not used) and furnishes a better view of the middle ear. After an electric irritation of the

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[1] Compare the review in these ARCHIVES.

upper end of the cut nerve,[1] he saw a great dilatation of the blood-vessels producing a livid hue, and a greatly increased secretion of mucus in the tympanic cavity. For the explanation of these phenomena he considers many possible causes. There is either a greater irritation of the secretory nerve fibres of the mucous membrane by way of a reflex action, or the electric irritation passes along the third branch, and causes dilatation and increased secretion through the gang. otic by increasing the quantity of blood in the parts. The otic ganglion and the third branch of the trigeminus would then have the same relation to the mucous membrane of the tympanic cavity as the spheno-palatine ganglion and the second branch have to the mucous membrane of the nose. Kirchner does not seem to have read Baratoux's work while he was making his experiments, and it is so much the more interesting, since the two authors have arrived at the same results independent of each other. We thereby gain more trustworthy knowledge of the action of the two important groups of nerves on the ear,—the sympathetic and trigeminus. It is fair to conclude that from this method of experimentation we will also gain definite knowledge of the exact nature of a series of ear-affections which we have heretofore designated "nervous defective hearing, sclerosis, etc."

8. BECHTEREN has observed that in operations on dogs which he had done before, after wounds of the inner parts of the upper rounded portion of the substantia nigra of the crura cerebri, between the pons and the ganglia of the cerebrum, continuous rotary motions moving the long axis of the body take place toward the non-wounded side. Besides these rotations of the head and body, also a deviation of the eyes in such a manner, that one eye with a dilated pupil appeared deviated upward and outward, and the other with a contracted pupil, downward and inward. Similar symptoms occurred after wounds in the infundibular region of the third ventricle (see original). Bechteren therefore thinks that those parts stand in communication with the centre of equilibrium in the cerebellum, like the terminal nerve-apparatus in the ampullæ, by nerve-tracts which run to the crus cerebelli. This takes place by fibres which decussate, while the ampullar nerves pass upward to the crus cerebelli in a straight course. He thinks it further possible that sensations can be produced by the motions

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[1] Kirchner chooses the third branch from practical reasons, because its area of distribution is in the nasal cavities, and because its section has far less influence than that of the first and second branches.

of the fluids in this region, which can lead to the estimation of the position of the head, giving a second organ for the sense of space, which could act vicariously with the labyrinth in case of a destruction of the latter apparatus.

III.—PATHOLOGY AND THERAPEUTICS OF THE EAR.

By A. HARTMANN, Berlin.

(Translated by William C. Ayres, M.D., New York.)

GENERAL.

1. Dr. Christinneck. Statistical report on the cases examined and treated in the clinic in Halle, from Oct. 15, 1880 to Oct. 15, 1881. *Arch. f. Ohr.*, vol. xviii, p. 284.

2. Dr. Bürkner. Report of cases treated in clinic at Göttingen. *Ibid.*, p. 297.

3. J. J. Kirk Duncanson. Report of cases treated in the Edinburgh Ear Dispensary. 1882.

4. Thomas Barr. Special report of 1,088 ear-patients treated at the Glasgow Western Infirmary, from Nov. 6, 1877 to May 28, 1881, with remarks. *The Glasgow Med. Journ.*, Feb., 1882.

5. C. R. Agnew and David Webster. Clinical contributions to otology. These Archives, vol. x, p. 335.

6. R. Schalle, Hamburg. On the treatment of diseases of the ear and nasal cavities. A posthumous paper. With a short preface by S. Moos, of Heidelberg. These Archives, vol. xi, p. 113.

7. Samuel Sexton. Cases of deafness in school-children. Washington Circulars of Information, No. 5, 1881. See Dr. Burnett's report.

8. Dr. Hedinger, Stuttgart. On the ear-diseases of engine-drivers. *Deutsche med. Wochenschr.*, No. 5, 1882.

9. S. Moos, Heidelberg. Railroad accidents which could have been caused by defective hearing of the engine-driver or fireman. These Archives, vol. xi, p. 91.

10. J. Baratoux. Pathogenesis of the affections of the ear. Paris.

11. J. Baratoux. The relations between ear-affections and uterine diseases. Paris, 1880.

12. P. McBride. Diseases which involve the ear. *Edinb. Med. Journ.*, Feb. and March, 1882.

13. E. Weil, Stuttgart. The results of an examination of the ears of 5,905 school-children. These Archives, vol. xi, p. 33.

14. E. Weil, Stuttgart. Is there a continuous physiological noise in the ears? *Monatsbl. f. O.*, No. 2, 1882.

15. Dr. K. Bürkner. On the importance of Leiter's temp. regulator in the treatment of ear-diseases. *Archiv f. Ohrenheilk.*, vol. xviii, p. 115.

16. Dr. Czarda. A fixation apparatus for aural and nasal specula and catheters. *Prag. Wien. med. Presse*, No. 2, 1882.

17. Dr. Grazzi, Firenze. Del bagno a vapore naturale, etc. *Giornale internaz. delle scienze med.*, Anno, iii.

18. Dr. J. Michael, Hamburg. Psychrophore. A new illuminating apparatus without heat. *Illust. Viertelj. f. ärztl. Polytechnik*, vol. iii, 1882.

18 *a*. Schrauth. Communication from the Munich Garnisons-Lazareth. Report of the ear department, with remarks on the forensic importance of ear-diseases. *Bayer ärztl. Intelligenzblatt*, Nos. 16 and 18, 1882.

18 *b*. Hedinger. The new method of treating middle-ear diseases. *Würtembergisches Correspondenzbl.*, No. 7, 1882.

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1. Christinneck's statistical report of Schwartze's clinic includes 494 cases which were treated in 1880–81. The operations are tabulated. In 50 cases of paracentesis there were only 16 with subsequent inflammation and suppuration. Several histories of cases are given, two of which are of syphilitic disease of the external canal; one of exfoliation of a necrotic cochlea, where the tuning-fork was heard better on the affected side.

2. Bürkner treated 516 patients in 1881. He makes some remarks on the treatment of otitis media suppurativa with iodoform. He observed but little effect from the remedy. He also observed a case of varioloid in the external canal, and one of fracture of the walls of the canal.

3. Kirk Dunkanson's report covers 500 cases. He makes a few remarks on the removal of foreign bodies from the canal and on the instruction of aurists.

4. Thomas Barr treated 1,088 cases during the time stated.

8. HEDINGER reports on the examination of 148 engine-drivers and firemen. He used an improved (?) Politzer's hammer with a normal hearing distance of five metres; also a large *A* tuning-fork of König. His results are given in four tables. He also comes to the conclusion, that a diminution of hearing results from the occupation of these people. The number of those who have defective hearing increases with the length of time they have pursued this occupation. The objective conditions were almost always those of the sclerotic form of middle-ear catarrh. Naso-pharyngeal affections were very frequent. Subjective noises were seldom complained of. Hedinger agrees with Schwabach and Pollnow.

10. The clinical part of BARATOUX's monograph is a meritorious presentation of the affections of the ear which are brought about by nervous disturbances. He tries to bring such affections into accord with his physiological knowledge. The description is based on experiments which are partially his own, partially collected from aural literature. In the first chapter he treats of those ear-diseases which depend upon some abnormality of the sympahetic; and in the second, of those which depend in the same way upon the trigeminus; and in the third, those which come from the cord. We may conclude from his book: That all febrile diseases which are attended by increased blood circulation cause changes in the ear, as congestion, suppuration, hemorrhage, and noises—hardness of hearing. All lesions of the trigeminus before its exit from the skull can produce defective nutrition in the ear. It is probable that disturbances in the vaso-motor centre can bring about ear-disease, but the experiments in this direction are not conclusive. It is, however, probable, that spontaneous hemorrhage is the result of some disturbance of the cerebral-axis, as many cases of Ménière's vertigo depend upon hemorrhage in the inner ear.

11. After an introduction in which BARATOUX treats of the connection between the diseases of the sexual organs and those of the ear, or between ear and uterus, he describes those ear-diseases which occur at puberty. The advent of this period can cause an improvement or an aggravation of old ear-affections, and it may also be that one ear, having remained healthy up to that time, may then become diseased. The diseases which are observed during menstruation are distinguished by noises, which are loudest 2–3 days before the hemorrhage, and diminish toward the end of the period. Besides these, all other ear-diseases may be influenced.

He reports seven cases in which such a relation could be demonstrated. In the fifth chapter Baratoux treats of ear-diseases which occur during pregnancy. Here also an old condition may become worse, or an entirely new one set in.

Finally, he cites a case where an ear-disease caused a uterine trouble to appear. The case was one of otitis media with polypi, which had existed for five years. The secretion increased during menstruation (age 28). When the polypi were removed there was a simultaneous hemorrhage from the ear and the vagina, notwithstanding the fact that the patient had menstruated only thirteen days before. In the after-treatment, every time the ear was treated, vaginal hemorrhage occurred. Her menstruation returned one month after the operation, and went on regularly from this time.

12. McBride gives a compilation of the literature on the secondary ear-diseases which occur after acute febrile diseases (as measles, scarlet-fever, chicken-pox, typhus, etc.), and after other general diseases (gout, rheumatism, syphilis, tuberculosis, leukæmia, Bright's disease, etc.).

14. Weil has a continuous seething noise in both of his ears, like that of a gas flame, and opens the question whether there is a continuous physiological noise in the ear.

15. Leiter's heat regulator, which is recommended by Bürkner, consists in a spiral lead tube, through which water of any temperature can be passed. The tube can be made into any required form. Cold water showed itself to be useful in a case of otitis externa diffusa, in two cases of otalgia, in otitis media acuta, and especially in periostitis of the mastoid. The warmed lead tube worked well in furuncles, and in a case of a large abscess of the auricle.

16. Czarda describes a fixation apparatus according to the principle of the stopcock by compression, which can be attached to the forehead band, or to the steel spring which he has recommended before. The speculum or the catheter is held between its two branches.

17. The grotto of Monsummano is said to be beneficial for deafness. Grazzi has visited the place, and describes it. It consists in a cave 260 metres long, with warm atmosphere of a temperature of 30–33° C. In connection with this there is an institute attended by two physicians. The grotto is used as a steam bath, the length of using it being generally one hour.

Grazzi thinks that catarrhal ear-affections of short duration can be treated there with benefit.

18. The apparatus which MICHAEL describes as a psychrophore, for the purpose of illuminating the cavities of the body with cold light, is made by using a phosphorescent substance, and gives a relatively bright light. The substance is enclosed in a glass bulb, into which two electrodes enter. The globe is fastened to a handle, and is connected by two copper wires to a Rumkorff's inductor. A condenser and switch are attached. The intensity of the light is about 0,01 of a candle, but since it can be brought close to the part to be inspected, a double brightness can be obtained.

18 *a*. Of the 330 cases treated at the military clinic in Munich, the great majority were affections of the middle ear, and most of these due to catarrh. SCHRAUTH explains the frequency of ear-disease in the troops, by the small amount of pathological change that they exhibit, and the surgeons confining their attention simply to the subjective symptoms in such cases. After giving the complete histories of seven cases, he discusses the forensic importance of ear-diseases, and especially traumata, and their relations to consecutive complications of the brain, carotis, jugularis, and sin. transversus.

18 *b*. HEDINGER recommends boracic acid, since it acts as an antiseptic. Only in cases where there are already large granulations, and in chronic muco-purulent catarrh he does not use it.

In granulations he uses salicylic acid ; in larger ones he uses caustics, preferring a ten-per-cent. solution of salicylic acid in alcohol. Chloride of zinc is energetic but painful ; chromic acid (in crystals) deliquesces too much. He considers galvano-caustic the safest and cleanest agent.

In large granulations he uses pure alcohol ; in suppuration without granulations, idoform and sometimes resorcin. In cases of suppuration and complication of the mastoid he prefers the conservative to the operative method.

EXTERNAL EAR.

19. LAURENCE TURNBULL. Acute inflammation of the auricle. *The Med. Bulletin*, No. 4, 1882.

20. H. KNAPP, New York. Congenital fibrous closure of the external canal. The opening frustrated by hæmophilia. These ARCHIVES, vol. xi, p. 19.

21. B. Löwenberg, Paris. Le furoncle de l' oreille et la furonculose. Delahaye and Lecrusnier, 1881.

22. Thomas Barr. Furuncular or circumscript inflammation of the external meatus. *Glasgow Med. Journal*, March, 1882.

23. Dr. Wette, Cologne. A case of acute desquamative inflammation of the drum-membrane. *Monatsch. f. Ohrenheilk.*, No. 2, 1882.

24. F. Graf, Frankfort. On the artificial drum-membrane, especially the cotton pellet. These Archives, vol. xi, p. 109.

25. Charles Orr, New York. Occlusion of the external meatus. *American Journ. of Otology*, vol. iv, p. 45.

26. Tage Hansen, Aarkus. Exostosis of external meatus, etc. *Hospitals-Tidende*, vol. ix, No. 3.

27. S. C. Ayres, Cincinnati. Exostosis of the external canal. These Archives, vol. x, p. 327.

28. Swan M. Burnett, Washington. Otomyces purpureus in the human ear. These Archives, vol. x, p. 319.

19. Turnbull describes four cases of acute inflammation of the auricle. The treatment of the first stage was antiphlogistic, with compresses. If fluid has been secreted an opening must be made for drainage. The after-treatment consisted in painting with iodine and the use of compresses. Treated in this way, the resulting malformation of the auricle was only slight.

21. This very exhaustive paper of Löwenberg on furuncles and their formation (46 pages) contains much which was said by the author on the subject at the congress at Milan. Contrary to Pasteur (who thinks that furuncles result from a precipitation of micrococci from the blood), Löwenberg believes that when a furuncle has been once formed by an accidental accumulation of specific micrococci in a gland follicle, a relapse and extension are brought about by propagation of the microbes on the surface to other follicles, thus producing new furuncles by auto-contagion. Only the worst cases of furuncles must be explained by micrococci circulating in the blood. The relation of diabetes mellitus to the formation of furuncles, he explains by the fact, that sugar is conducive to the formation of micrococci, notwithstanding the fact that sugar water is not very productive of micrococci. His communications on the contagiousness of furuncles are worthy of note.

In conformity with his ideas as to the pathogenesis of furuncles, he discards the use of salves and heat in their treatment. He considers boracic acid in aqueous or alcoholic solutions the best treatment. Lukewarm instillations are also made after incision. He recommends this since the nests of micrococci are thereby laid bare, and the remedy then comes in direct contact with them. Boracic acid also prevents auto-contagion. In conclusion, he calls attention to the frequent occurrence of furuncles in all armies. Where scrupulous cleansing is not possible Löwenberg recommends the powdering of the opened furuncles with boracic acid morning and evening.

22. BARR gives the most recent ideas on circumscribed inflammation of the outer ear. As a preventive he recommends : The external canal must be kept dry in otorrhœa, and eczematous inflammations done away with. Early incision is better than cautery in the first stages. If an operation is refused, moist warm applications are to be made. Besides this, general treatment is important.

23. WETTE describes a case of a recurring epidermoid membrane on the drum-head, in a patient who had had otorrhœa.

25. ORR describes three cases of closure of the external canal from Sexton's clinic. See Dr. Burnett's report.

26. HANSEN reports a case of mamillary exostosis in the right ear of a 26-year-old man. The tumor had its origin in the anterior wall and almost closed the whole canal. The patient did not have scrofula or syphilis. The operation was done with a drill and a forceps. Resulted in cure. (Rev. by v. BREMER.)

MIDDLE EAR.

29. CLARENCE J. BLAKE, Boston. Acute congestion of the upper part of the tympanic cavity and the drum-membrane. *Am. Journ. of Otol.*, vol. iv, p. 102. See Dr. Burnett's report.

30. EUGENE HOLT, Portland. Acute inflammation of the middle ear. *Ibid.*, vol iv, p. 106. See Dr. Burnett's report.

31. S. MOOS, Heidelberg. On a case of pyæmia in the course, and after the healing, of an acute suppurative otitis media. *Zeitsch. f. Ohr.*, vol. vi, p. 238. (To appear in our next number.)

32. Dr. A. EITELBERG, Wien. On the treatment of chronic otorrhœa. *Wiener med. Presse*, 1882.

33. Dr. J. MICHAEL, Hamburg. A fluid artificial drum-head, and a new method of treating chronic otorrhœa. *Berl. klin. Wochenschr.*, No. 8, 1882.

34. Dr. Moure. Une perle enkystée dans l'oreille. *Revue mensuelle de laryngologie*, etc., No. 6, 1881.[1]

35. Chas. H. Burnett. Salicylate of quinine for otorrhœa. *Am. Journ. of Otol.*, vol. iv, p. 122. See Dr. Burnett's report.

36. Albert H. Buck. The value of counter-irritation in certain ear-affections. *Ibid.*, vol. iv, p. 166. See Dr. Burnett's report.

37. Thaulow. A rare case of bad hearing. *Norsk Magaz. f. Laeger*, vol. xi, No. 9, 1881.

38. Dr. Kirchner, Würzburg. An apparatus for aspirating and washing out exudations from the tympanic cavity. *Arch. f. O.*, vol. xviii, p. 158.

39. H. Knapp. Trephining of mastoid in a case of chronic aural catarrh with intact drum-membrane. Opening of the lateral sinus. Healing by first intention. These Archives, vol. x, p. 365.

40. Schwartze. A second series of 50 cases of surgical opening of the mastoid. (Continuation.) *Arch. f. O.*, xviii, pp. 163 and 273.

41. S. Moos, Heidelberg. Cholesteatoma of the mastoid with acute perforation into the external canal after the use of the Irish-Roman bath. Complete cure. *Zeitschr. f. Ohr.*, vol. xi, p. 233. (To appear in our next number.)

42. S. Moos, Heidelberg. Exfoliation of a necrosed bony (the upper ?) semicircular canal, preceded by vertigo and vomiting for a week. Cure with loss of what hearing was present before. *Ibid.*, vol. xi, p. 235. (This and the following communications to appear in our next number.)

43. S. Moos, Heidelberg. Further report on the above communication of necrotic exfoliation of a semicircular canal. *Ibid.*, vol. xi, p. 248.

44. S. Moos, Heidelberg. Œdema of the region of the temporal and zygomatic bones as a symptom of phlebitis and thrombosis of the lateral sinus. *Ibid.*, vol. xi, p. 242.

45. W. Oliver Moore, New York. Acute otitis media supervening on ot. med. pur. chronica. Necrosis of temporal, occipital,

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[1] The *Revue mensuelle de laryngologie, d' otologie, et de rhinologie*, founded and published by Dr. E. J. Moure, Paris, Octave Doin, appears now in its third year. The few otological papers contained in the first two volumes are inferior to the laryngological, the majority of which are by Moure. As collaborators we find the names of Gruber, Lennox Brown, Miot, Sexton, Voltolini. The scientific importance of the journal approaches that of the *Annales des Maladies de l'oreille, etc.*

and parietal bones, with closure of lat. sinus, and abscess in cerebellum. These ARCH., vol. xi, p. 25.

46. G. S. MUNSON, Albany, N. Y. A case of chronic suppurative otitis, with exostosis of the external canal: brain abscess; death; autopsy. *Ibid.*, vol. xi, p. 29.

47. ALBERT BURCKHARDT-MERIAN, Basle. Supplement to Prof. Moos and Dr. Steinbrügge's case of hyperostosis and exostosis, etc. *Ibid.*, vol. xi, p. 106.

48. CLARENCE J. BLAKE, Boston. Aural polyp snare. *Am. Journ. of Otol.*, vol. iv, p. 23.

49. Dr. WEBER-LIEL, Berlin. Middle-ear affections. Reprint from Eulenburg's "Real-Encyclopædie."

50. CHAS. H. BURNETT, Phila. Injury of the auricle and of the mastoid, with facial paralysis. *Am. Journ. of Otol.*, vol. iv, p. 119.

51. S. POLLAK, St. Louis. Necrosis and elimination of almost the whole bony apparatus of the ear. These ARCHIVES, vol. x, p. 361.

52. J. D. RUSHMORE. A case of hemorrhage from the ear, probably due to a fracture of the skull. *Ibidem*, vol. x, p. 315.

53. S. MOOS and H. STEINBRÜGGE, Heidelberg. On the formation of a neo-membrane in the drum-cavity as a result of pachymeningitis hæmorrhagica. *Ibid.*, vol. xi, p. 97.

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32. EITELBERG reports 92 cases of chronic suppuration of the ear from the clinic of Urbantschitsch, in six tables, and gives their causes, treatment, and average duration. Almost one half of them are under the head, "from unknown causes." 15% were from scarlet-fever, 11% from measles. Among the 11 after scarlet-fever, 6 could not be shown to have completely stopped running. None of 5 cases after variola was cured. Most of them were treated with iodoform powder; also boracic acid, alcohol, etc., were used. Pure iodoform powder is inferior to iodoform gelatine and iodoform collodium. Of 29 cases 11 were cured. The treatment had to be stopped in some cases on account of headache, sickness of the stomach, etc. In one case of a nervous young girl, short hallucinations were produced. The use of iodoform induces the formation of furuncles quite often. Boracic acid, which acts just as well as iodoform, is borne much better. Sometimes when one medication did not act well, the disease was speedily cured by another.

33. From the fact, that some patients who have perforations of the drum-membrane hear better when the ear is still full of water after syringing, MICHAEL tried the following: he dropped glycerine into the ear with a pipette, drop by drop, until the greatest distance of hearing was reached; he then put in a few drops of collodium while inclining the head to the opposite side. After ¼ of an hour the result was very gratifying. Before, the patient required to be spoken to loud in the ear, whereas after, he could hear a whisper at fifteen feet. At first the collodium remained only a half-hour; later it was required only every week. Instead of pure glycerine, alum or tannin can be mixed with it, which has a good effect on the otorrhœa. Michael thinks that many of these obstinate cases which resist other methods of treatment, can be cured in this way.

34. In the case of a patient with chronic otorrhœa, MOURE found a small tumor in the region of the posterior inferior wall of the tympanic cavity, which proved itself, on closer inspection, to be a pearl covered with mucous membrane. It was not removed, as a consequent inflammation was probable.

37. In the case of a 13-year-old boy who was considered a deaf-mute, THAULOW found that after a treatment of six weeks with the air drouche and sal ammoniac, he could hear a loud noise at one metre, and had learned to talk somewhat. On account of this experience he thinks that an examination of all the children in deaf-mute institutions should be obligatory. (Rev. by v. BREMER.)

38. KIRCHNER'S apparatus for the aspiration and washing out of the exudations in the drum-cavity differs from that of the reviewer in that it has a flexible tube, so that it can be given any desirable curvature; and besides this, the tube is fastened to a handle. As far as the first modification is concerned, the bend, close to a right angle, which is necessary, in order to throw the stream into the various parts of the tympanic cavity, is impracticable, since under such conditions the sides of the tube would approach too close together. In order to obviate this, the instrument-maker bent the tube after putting a lead rod into it, which was afterward melted out. If the tube is fastened to a handle, motions of the patient cannot fail to cause damage to the parts, while if the tube is connected with an India-rubber tube, it stays in position without being held, and follows the motions of the patient. If the tube is held by the hand of the patient himself, it will follow the motions of his body and do no damage.

40. SCHWARTZE reports the histories of nine new cases of opening of the mastoid. The first three cases and the last (Case 85) were widenings of fistulæ, and in two of these it seemed as if they would cause death in a short time, even during the operation. In one case death occurred in eight days, and in the other one day after the operation. In Case 85 death from meningitis occurred four weeks after the operation. In the fourth case an externally normal mastoid was opened with good result. In the remaining cases of caries necrotica of the mastoid, the opening was followed by good results.

49. WEBER-LIEL describes those cases of middle-ear affections (Eulenburg's "Real-Encyclopœdie," p. 47) which are not combined with perforation of the drum-membrane. The condition of the Eustachian tube plays the most important part in these conditions. According to him, the want of ventilation is brought about by collapse of the tube, since in the oft-repeated inflammations of the tube we have atrophy of the mucous membrane and loss of elasticity of the cartilage. In the most pronounced cases it results from the loss of power in the tubal muscles. He first treats of the chronic affections of the middle ear: as chronic catarrh, moist and dry; sclerosis of the mucous membrane of the drum-cavity. He considers a probing of the tube as indispensable to the diagnosis of the first condition. Reduction of secretion by the use of the tympanic catheter, by sucking it out, or by injection with the instrument described by him as koniantron, is very minutely gone into. Weber-Liel advances peculiar theories for the explanation of sclerosis of the mucous membrane of the tympanic cavity. He thinks that the diminution of hearing is not explained by the tissue-changes present, and that other causes must be at work, and that the sclerosis is but one result of a general process which involves the whole acoustic apparatus. Notwithstanding this opinion, he thinks that the origin of the process is to be found in an alteration of the muscular apparatus of the middle ear.

Weber-Liel thinks that he has found in most cases a weakness of the muscles of deglutition, and attaches great value to his observations of the intratubal application of the faradic and constant currents, which he considers as the crucial experiments in support of the correctness of his views. Subjective sensations of the patients, spasmodic contractions, and clicking noises were subjected to the electrical examination, and said to have disappeared in the later stages of the process. Besides this, he alleges that a permanently increasing reaction of the tensor tympani muscle takes place. Corresponding to these views, the treatment consists chiefly in the electrization of the pharyngo-tubal muscles and the tenotomy of the tensor tympani. In conclusion, he discusses the acute and subacute affections of the middle ear, the traumatic and artificial, the idiopathic and symptomatic (in acute infectious diseases) inflammations, and the otitis intermittens.

NERVOUS APPARATUS.

(Translated by Dr. HENRY G. CORNWELL, Columbus, Ohio.)

54. BRUNNER, Zurich. A case of complete mono-lateral deafness after mumps ; with critical remarks. These ARCHIVES, vol. xi, p. 102.

55. USPENSKY, Moscow. Deafness complicated with hysterical phenomena, and hysterical deafness. *Petersb. med. Wochenschr.*, No. 8, 1882.

56. WEISS, Vienna. A case of aphasia with word-deafness. *Wiener med. Wochenschr.*, No. 12, 1882.

57. HUGUÉNIN. Neuritis olfactoria. *Corr.-Bl. f. Schweizer Aerzte*, 1882, Nos. 9 and 10.

58. BROWNE. A case of insanity, with hallucinations of hearing, of seven years' standing, depending on disease of the middle ear. Royal Naval Hospital, Great Yarmouth. *Brit. Med. Journ.*, May 13, 1882.

55. USPENSKY observed two cases, where, in one instance, as a result of severe diphtheria, the greater part of both drum-heads was destroyed, attended with discharge and total deafness. As a result of treatment the discharge ceased, and the treatment of the deafness went on favorably for a year. At times the hearing would become suddenly restored, and again abruptly return to its former condition. After the employment of the galvanic current five times, the hearing was permanently restored.

In the second case, the patient was wholly deaf, having perfectly normal drum-heads, but with complete anæsthesia of the auricle and external auditory canal. On using the constant current, no effect was obtained with 1, 2, 5, 8, or 10 cells ; 12 cells, however, brought about the normal sensibility and complete restoration of hearing.

56. In the case described by WEISS of word-deafness, together with hemiplegia of right side, and aphasia, the clinical diagnosis of embolism of the *arteria fossæ Silvii sinistra* could be made, together with consecutive softening of the *island of Reil*, the first temporal convolution, and the nerve ganglia of the same side. The autopsy exhibited the fact that the aphasia and word-deafness depended on a lesion of the island of Reil and the first temporal convolution of the left side.

57. To HUGUÉNIN is due the credit of demonstrating the fact that in brain tumors the resulting *neuritis optica descendens* is due to a chronic inflammation of the sheath of the nerve. The same condition occurs in brain tumors, giving rise to anomalies in the sense of smell, due to a *neuritis olfactoria*. Huguénin describes a case of sarcoma of the right temporal lobe of the brain, with chronic inflammation of the *pia*, which extended from the location of the tumor over the entire base of the brain. The *chiasma* and *bulbi olfact.* were enclosed in new-formed tissue, and finally became atrophic. During life there was complete loss of sight (*neurit.-descend.*) and of smell, together with paralysis of the facial and hypoglossal of left side, caused by inflammatory œdema of the right *crus cerebri*, with atrophy of the right pyramid in progressive dementia. In a second case, only clinically observed, the crossed paralysis (left facial and hypoglossal and right extremities) was explained by the presence of a tumor at the lower border of the *pons* probably involving the *crus cerebelli ad pontem*, the patient having gyratic ataxia. The atrophy of the optic nerves, together with total blindness of both eyes, as well as complete loss of smell, was the result of a neuritis of the optic and olfactory nerves through an extension of basilar meningitis. *In an analogous manner, in both cases was the loss of hearing due to an inflammation of the auditory nerves.* The writer concludes that the disturbance of sight, hearing, and smell does not assist us in determining the location of a cerebral tumor. Almost all brain tumors cause a chronic inflammation at the base of the brain, which results in a neuritis descendens in the exposed nerves, where, according to its intensity, it brings about atrophy.

58. A sailor, aged 43 years, in 1874 took cold with congestion of the brain, giddiness, etc.; the result soon after, well-established insanity with hearing hallucinations of a roaring character. Seven years later an old middle ear catarrh was discovered, and after treatment the hallucinations and other brain symptoms completely disappeared.

NOSE AND NASO-PHARYNX.

(Translated by Dr. H. G. CORNWELL, Columbus, O.)

59. SCHEFF, Vienna. Rhinitis, coryza, acute catarrh. *Wiener med. Pr.*, No. 20.

60. FRÄNKEL, Berlin. On the use of iodoform on the mucous membranes. *Berliner med. Wochenschr.*, No. 17, 1882.

61. MOURE. Des pseudo-tumeurs des fosses nasales. *Revue mens. de laryngol., d' otol.*, etc., No. 1, 1882.

62. HACK, Freiburg. Reflex nervous affections and nasal diseases. *Berl. klin. W.*, No. 25, 1882.

63. BRESGEN. Bronchial asthma and its relation to chronic nasal catarrh, together with its local treatment. *Volkmann's Samml.*, No. 216.

64. JURASZ, Heidelberg. On the treatment of marked deflection of the nasal septum. *Berl. klin. W.*, No. 4, 1882.

65. SCHÄFFER, Bremen. Nasal polypi. *Deutsche med. Wochenschr.*, No. 23, 1882.

66. HARTMANN, Berlin. On the indications for the extraction of polypi. *Berl. klin. Wochenschr.*, No. 1, 1882.

67. LÖWENBERG. Des végétations adénoides dans la cavité naso-pharyngienne. *Extrait du journal de thérap.*, Paris, 1881.

68. BOSWORTH, New York. Adenoma at the vault of the pharynx. *Amer. Journ. Otol.*, Bd. iv, p. 37.

69. PURICELLI, Bamberg. A simple method of applying medicated fluids to the nasal mucous membrane and middle ear. *Berl. klin. Wochenschr.*, No. 8, 1882.

59. After a long introduction on the normal anatomy of the nose, SCHEFF takes the ground that an individual disposition to cold does not exist, but that this condition is brought about by peculiarities in the structure of this organ. He then discusses fully the subjective, as well as the rhinoscopic appearances of this disease, and the various methods of treatment, and recommends in general an expectant course of treatment. For dryness and obstruction he uses a 2–3% sol. of salt or bicarb. of soda to snuff, and only when the discharge is thin and profuse he gives astringents; when the discharge is thick and purulent, a solution of carbolic acid (1–2%), or salicylic acid (5%), or chinolin (1.5%).

60. FRÄNKEL has employed idoform in diseases of the nasal passages, and particularly in the form of powder. The insuffla-

tion does not excite pain. It can be used with an addition of finely powdered boracic acid, or mixed with an equal part of tannin, or one part of tannin and two parts of iodoform, as a snuff. The salve can also be used (one part to ten) on the nasal mucous membrane or naso-pharynx, with a brush or cotton pellet. Poisoning from this small quantity is not to be feared. The iodoform is decomposed on the mucous membrane by the fatty substances, and the iodine constantly acting in *statu nascenti* is absorbed as iodide of albumen. A small quantity of it is, in many cases, discovered in the urine. It further acts as a strong antiseptic, encourages the formation of granulations, has local anæsthetic properties, and also is a specific for syphilis and tuberculosis. He has also obtained very favorable results from the iodoform treatment in atrophic catarrh of the nose and naso-pharynx.

In ozæna he uses first cotton tampons smeared with iodoform salve ; later, iodoform powder ; and obtained marked improvement in three cases out of nine. The scabs come away, the offensive smell disappears, and the mucous membrane is better nourished.

In rhinitis scrofulosa he used a salve of one part of iodoform, two of tannin, and ten of vaseline, with surprisingly favorable results. Within a few days the purulent discharge ceased and the excoriations of the upper lip entirely healed.

61. MOURE describes as pseudo-tumors the red hemorrhagic condition of the anterior end of the inferior turbinated bones, due to the presence of foreign bodies or the retention of pus. By the removal of the foreign bodies or the pus collections, the tumors disappear. Three cases are reported.

62. In consideration of the nervous connection between the nose and the organs of respiration, which is shown in the case of asthma from polypi, HACK came to the conclusion that hyperæmia, or a slight swelling of the mucous membrane, must more readily give rise to a direct irritation of the terminal nervous apparatuses, than when the latter are covered by hypertrophic connective-tissue layers and indolent tumors. He found that nasal diseases of trifling significance are frequently accompanied by marked neuroses, which disappear after the healing of the local affection, or even after the diminution of the excitability. A case of spasmodic sneezing and headache is reported, where, with but few symptoms, swelling and peculiar spotted injection of the mucous membrane over the middle turbinated bone were

observed. By the use of the galvano-cautery the spasmodic sneezing and headache quickly disappeared. The writer then suggests the question whether many cases of migraine may not have their origin reflected from the nose. In another case there was diffuse swelling of the nasal mucous membrane covering the under and middle turbinated bones, the cause of bronchial asthma and spasmodic sneezing. In a third case, a polyp the size of a pea on the right middle turbinated bone was the cause of an obstinate spasmodic cough, which was very marked on recurrence of the growth, and disappeared on its removal. A case of supra-orbital neuralgia, with scintillating scotoma, was occasioned by a small granulation on the middle turbinated bone. Hack holds that supra-orbital neuralgia dependent on nasal disease is purely reflex in character, and not through an affection of the frontal sinuses. Among the other cases of reflex nervous disturbances occurring in connection with diseases of the nose and naso-pharynx, a case is cited where, after cauterizing granulations in the naso-pharynx in an epileptic, the frequency of the convulsive attacks was much lessened. He believes that in such conditions a direct communication between the mucous membrane of the nasal passages and the subdural and subarachnoid spaces plays an important part.

63. BRESGEN gives in his article a very clear and convincing argument of the already suggested theory concerning the relation of bronchial asthma to nasal affections, and introduces therein many peculiar ideas.

In the treatment of asthma particular attention must be given to the removal of polypi. The faradic current, after the manner of Schäffer, in a reported case, had a very favorable influence on asthmatic attacks. In the other cases Bresgen observed the disappearance of asthmatic attacks with the cure of the nasal disease.

64. JURASZ calls attention to the results of lateral deviation of the nasal septum, and the various forms observed. They are seldom seen in the bony portion ; in the cartilaginous they are either single or double (S shaped), having either sharp angles, or round protrusions, and are either perpendicular, oblique, or parallel to the floor of the nose. Frequently a sharp or angular prominence is found where the fibrous and cartilaginous portions unite.

The method of Michel, viz., the removal of the irregularity by repeated pressure, Jurasz regards as valueless. This operation is easily carried out in the anterior third of the nasal fossæ, but in the middle and posterior portions it is very difficult. The writer cites cases of Heylen, Demarguay, and Cassaignac.[1] A commonly employed method is that of Blandin-Rupprecht, where a section from the prominence is removed, but, according to Jurasz, this is only palliative in its effect. He regards the operation suggested by Adams as much more effective. By this method the irregular septum is brought into a desired position; and then a compressor, and later ivory plates, are applied. Jurasz completes this operation at one time, as in most instances before the application of the compressor the septum returns again to its former faulty position. He therefore united the forceps and compressor into one forceps-like instrument, each half of which is introduced separately. After their closure, he screws the under half off, so that only the compressor remains, which in three days is replaced by ivory plates, as mostly ulcerations from pressure and swelling of the mucous membrane appear. In conclusion, the writer reports two cases in which he operated according to his method and obtained good results.

65. SCHÄFFER arranged the cases of nasal polypi, operated by himself, in a table, under age, variety, location, and method of operation. The development of the growths was not considered. In general there were 102 mucous polypi and 8 other new formations operated on. Schäffer confirms the experience of Cloquet and the reviewer, that pedunculated polypi are at times found on the nasal septum. In a case of closure of one of the nasal passages, he bored through the septum with a galvano-cautery. Posterior rhinoscopy and digital examinations are indispensable in making a diagnosis. Pedunculated polypi can be more quickly, and perhaps more safely, torn out than cut off. After the removal of the polypi the point of their attachment was touched with the galvano-cautery. The telangiectatic tumors which are situated on the anterior end of the inferior turbinated bone, and which frequently give rise to profuse hemorrhage, can only be removed slowly with a wire snare at white heat.

66. HARTMANN adds another to the cases already reported by himself of nasal polypi growing in the upper pharynx, easily and safely torn out. A growth which filled the naso-pharynx was safely

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[1] The reference of Jurasz to the operations of Heylen and Cassaignac, in a discouraging way, is not confirmed by my own experience. I have, in two cases of very marked irregularities in the septum, operated with the bone scissors, obtaining excellent results. HARTMANN.

torn away with angular forceps corresponding to those of Museux. The extraction of polypi can be accomplished (1) in cases of soft polypi, by means of a snare through the anterior nasal orifices, more especially when they are in great numbers, and where it is possible to remove them rapidly; (2) in cases of polypi situated in the naso-pharynx, through the mouth, by means of forceps. The extraction, is not, perhaps, successful in all cases, but it may be tried before the use of the snare.

67. Reviewing the paper of LÖWENBERG on adenoid growths, we call special attention to the statement, that he has frequently observed deformities of the thorax due to interference of respiration by obstructions in naso-pharynx. The affection includes the tonsils, and often simultaneously the lateral walls of the pharynx. The removal of the tumors must be undertaken as early as possible and the calibre of the nasal passages and Eustachian tubes restored. The swelling due to hyperplasia of the tonsils can be operated on in various ways; the swelling of the lateral walls of the pharynx, particularly about the orifices of the Eustachian tubes, must be removed by means of a small galvano-cautery, under the illumination of a rhinoscopic mirror.

68. BOSWORTH operated on the adenoid hypertrophy of the mucous membrane of the naso-pharynx with the best results by means of the snare, besides the galvano-cautery and the curette. See Dr. Burnett's report.

69. PURICELLI employs the nasal bath, pouring or syringing the fluid into the nose, while the patient, through phonation or inspection before a mirror, shuts the naso-pharynx off from the soft palate.

ABSTRACT OF AMERICAN OTOLOGICAL LITERATURE FROM NOVEMBER, 1881, TO JULY, 1882.*

By Dr. SWAN M. BURNETT, of Washington, D. C.

1. Causes of deafness among school-children and its influences on education, with remarks on the instruction of pupils with impaired hearing, and on aural hygiene in the schools. By Samuel Sexton. Circulars of Information of the Bureau of Education, No. 5, Washington Govt. Printing Office, 1881.

This paper contains, among other things, the results of an examination of 570 school-children, 261 of whom were colored. Among these 13% were found defective as to hearing in one or both ears. Such examinations if properly conducted and made sufficiently extensive would, we are sure, lead to some useful knowledge, and probably to the development of some facts with an important bearing on aural pathology and physiology. We are sorry that Dr. Sexton appears to have neglected this opportunity for examining the teeth of those children who did *not* have aural diseases. We can hardly expect the scientific world to accept as a fact that dental troubles produce so large a proportion of aural inflammations until we know how many persons affected with dental troubles are not thus affected. Such loose statements, delivered in an *ex cathedra* manner, are calculated to do injury to scientific otology, particularly when they are given such currency as usually befalls a governmental publication.

2. Practical deductions drawn from one thousand digital examinations of the pharyngeal orifices of the Eustachian tube, and Rosenmüller's fossa. By H. H. Wynne. *Bost. M. & S. Journ.*, Nov. 17, 1881.

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* Continued from page 376, volume x, of these Archives.

The examination is made by passing the index finger of the right hand, in examination of the orifice of the right tube, up behind the soft palate to the orifice of the tube, which can be distinguished by a slight depression. The procedure is not painful, and the character of adenoid and other growths and the general condition of the mucous membrane are better made out by it than by an inspection with the rhinoscope.

3. On abscess of the brain in connection with disease of the ear. By G. S. Ryerson. *Canada Lancet*, Nov., 1881.

One case is related, that of a boy 8½ years of age, where the left ear was affected. *Post-mortem* examination showed the dura thickened and adherent to the calvarium. Brain congested, particularly on the left side ; ventricles full of serum. Small collection of pus under the pia of superior lobes. Extensive caries of roof of tympanum and sulcus lateralis. Lateral sinus full of clots and pus.

4. On acidum boracicum and calendula officinalis and their uses in aural disease. By Samuel Sexton. *N. Y. Med. Record*, Dec. 31, 1881.

The writer uses a mixture of equal parts of tinct. calendulæ and finely powdered boracic acid, made by evaporating the tinct. cal. down to a pasty consistency, mixing with the boracic acid, and then evaporating to dryness. It is then used as a powder poured or blown into the ear, for the various kinds of discharges, but particularly for chronic otorrhœas.

5. The treatment of diseases of the middle ear and contiguous parts by milder measures than those commonly in vogue. By Samuel Sexton. *N. Y. Med. Record*, Jan. 31, 1882.

In this paper, which was read before the N. Y. Academy of Medicine, Dr. S. endeavors to show that the usual antiphlogistic treatment of acute aural affections—such as leeches, paracentesis of the *Mt*, and incision over the mastoid—is calculated in the majority of cases to do more harm than good. In their stead he recommends the internal administration of sulphide of calcium. So far as our knowledge extends, Dr. S. stands almost alone in his opinion, both as to the inefficiency of the treatment he condemns, and the value of that he recommends.

6. The nature of the human temporal bone. By E. Coues. *Amer. Jour. of Otol.*, Jan., 1882.

This is from a comparative anatomist's point of view, and has no special interest for the practitioner. It is simply a résumé of

Huxley's well-known studies on the subject, made public in 1869. The Greek word chronosteon is offered as a substitute for "temporal bone."

7. Comparative morphology of the ear (third article). By C. S. MINOT. *Amer. Jour. of Otol.*, Jan., 1882.

In the present paper M. considers, according to European sources: 1. The paired otocysts of worms; 2, the median otocysts of turbellaria and tunicata; 3, the auditory hairs of crustacea.

8. Adenoma at the vault of the pharynx. By F. H. BOSWORTH. *Amer. Jour. of Otol.*, Jan., 1882.

The explanation of the impaired hearing in enlarged tonsils and growths in the pharynx and nose, by supposing them to press on the orifice of the Eustachian tubes, is not tenable, because examination has shown that no such pressure exists. There must, then, be some other connection between the two conditions. B. explains it by a rarefied state of the air in the middle ear, caused by the obstruction of normal nasal breathing.

In mouth-breathing the current of air which in nasal breathing passes over the mouth of the tube, takes a new direction, and the mouth of the tube lying, as it were, in a hollow, the air immediately about it becomes rarefied, with, of course, a consequent rarefaction of the air in the drum cavity. The action of the pharyngeal muscles is also impeded, adding another factor for rarefaction. In the treatment of adenomas of the pharynx, he prefers Jarvis' snare when he can use it; if not, then the galvanocautery. Chemicals he does not recommend. Two cases are related.

9. Occlusion of the external auditory meatus. By SAML. SEXTON. *Amer. Jour. of Otol.*, Jan., 1882.

Case 1.—Occlusion of external auditory meatus from the closure of a wound in the ear, immuring a wad of cotton-wool. Successful operation.

Case 2.—Occlusion of the external auditory meatus of 54 years' standing from blow of a horse's hoof.

Case 3.—Occlusion of external auditory canal from adhesive inflammation during an acute otitis externa during infancy.

10. On the intermittent perception of sound as conveyed through the cranial bones. By J. A. ANDREWS. *N. Y. Med. Jour.*, Feb., 1882.

In this paper A. considers those cases, several of which he relates in detail, in which, during an attack of middle-ear inflammation, the perception of sound through the bones, as tested by the tuning-fork, is lost, but returns again. He thinks this due to an increase, from some cause, of the intralabyrinthine pressure, which is in time relieved.

11. Scented iodoform powders for the ear. By Chas. H. Burnett. *Phila. Med. Times*, Feb. 11, 1882.

The odor of iodoform is so disagreeable, not to say offensive, to many persons, that it is highly advisable to conceal it if possible. For this purpose Dr. B. recommends a number of the essential oils, etc., to be used in combination with it. He has found particularly useful the formulæ, viz. : iodoform, ʒ i, bals. Peruvian., gr. iii ; and iodoform, gr. xx, tannin, gr. x.

12. Acute circumscribed inflammation of the meatus auditorius externus. By O. D. Pomeroy. *N. Y. Med. Record*, Feb. 25, 1882.

A clinical lecture. In treatment P. discards the old plan of cutting down on the furuncle in the early stage. Incision should be made only after pus has formed. Other therapeutic measures consist in leeches, heat, and a building up of the general system.

13. The use of constitutional remedies in the treatment of ear-diseases. By Samuel Theobald. *Med. News*, Feb. 4, and 18, 1882.

This is a plea for the more frequent employment of internal medication in the various forms of aural inflammation—particularly of the use of mercury. T. has used this remedy—preferably in the form of the biniodide—with much satisfaction in all forms of middle-ear inflammation and in mastoid disease as well as in labyrinthine affections. In dry catarrh he has found it efficient in many cases. He has also used muriate of ammonia internally in mucous catarrh of the drum. He recommends pyrophosphate of soda in furuncles. He has found the administration of mercurial cathartics of great value in the treatment of aural inflammations.

14. Facial paralysis occurring in connection with aural disease. By Samuel Sexton. *Ill. Quart. of M. and S.*, Jan., 1882.

Case 1.—Caused by necrosis of petrous bone.

Case 2.—Bilateral facial paralysis occurring in a case of sudden deafness from syphilis.

15. Significance of pain referred to the ear. By D. B. St. John Roosa. *Med. News*, Feb. 11, 1882.

Dr. R. considers pain in reference: 1. To foreign bodies in the external meatus. He is of the opinion that impaction of cerumen with its consequences is due in most instances to an inflammation of the integument of the external meatus. 2. Furuncles and diffuse inflammation of the external meatus. In treatment he uses poultices behind and in front of the ear and in the meatus, dressing of the inflamed integument and the warm douche. He is sceptical as to the value of sulph. calcium in these cases. 3. Diseases of the middle ear, including the tympanic cavity, Eustachian tube, and mastoid process, for which he uses leeches, poultices, the warm douche, and incision over the mastoid, according to the parts involved. Typical otalgia rarely occurs.

16. Treatment of chronic suppuration of the middle ear. By W. W. SEELY. *Cin. Lancet and Clinic*, Feb. 18, 1882.

S. never syringes the ear but cleanses with a probe and cotton. He then uses the boracic acid after Bezold.

17. Treatment of chronic catarrhal inflammation of the middle ear by fluid injections. By A. B. KIBBE. *Rocky Mount. Med. Times*, March, 1882.

Where he has reason to suspect collections of hardened matter in the drum cavity, K. uses fluid injections. He prefers a solution of iodoform in chloroform, 5 grs. to ℥ j, and iodine dissolved in chloroform.

18. Acute inflammation of the middle ear. By E. E. HOLT. *Amer. Jour. of Otol.*, April, 1882.

In 1,000 cases of ear-disease, H. found 92 cases of acute and subacute catarrh of the middle ear. The detailed histories of 10 cases are given. The 92 cases are tabulated, giving the age, ear affected, health of the patient, duration of the disease, and the result. Of those suffering from acute suppurative inflammation, 4 died.

19. The value of counter-irritation in the treatment of certain affections of the middle ear. By A. H. BUCK. *Amer. Jour. of Otol.*, April, 1882.

B. has returned to the old practice of counter-irritation in some forms of aural inflammation. He has found it of especial service in those cases in which there remains a greater or less amount of engorgement after the disappearance of pain. In children he paints the mastoid with tr. iodine, while in adults he uses the fly-blister.

20. Comparative morphology of the ear (fourth article). By C. S. MINOT. *Amer. Jour. of Otol.*, April, 1882.

In this paper M. considers in detail (with illustrations) the tympanal organs of orthoptera, and allied structures in other insects.

21. Acute inflammation of the auricle (perichondritis). By L. TURNBULL. *Med. Bull.*, April, 1882.

T. reports four cases, three of which were the result of blows. All terminated with but little deformity of the auricle.

22. Injury of the auricle and mastoid portion, followed by facial paralysis. By CHARLES H. BURNETT. *Amer. Jour. of Otol.*, April, 1882.

A piece of bone $\frac{1}{2}$ inch in length and breadth, and $\frac{3}{8}$ in. thick, was removed from the external auditory canal, which was evidently composed of mastoid cells, and which, to all appearances, contained the facial canal. An O S examination revealed a choked disc on the right side (the opposite to the injured side).

23. Salicylate of chinoline in otorrhœa. By C. H. BURNETT. *Amer. Jour. of Otol.*, April, 1882.

B. has found this remedy quite as good as resorcin in the treatment of otorrhœa, and it possesses the advantage of being an amorphous powder, which allows of its being readily insufflated.

24. Aural polypus snare. By C. J. BLAKE. *Amer. Jour. of Otol.*, April, 1882.

Blake has modified his tubular snare in such a manner as to have one end of the wire fixed, the other being attached to the sliding ring. By this means a cutting action of the wire is obtained which enables it to sever tough, fibrous polypi much more easily.

25. Case of mastoid abscess which ruptured into the lateral sinus. Death from pyæmia. By D. W. PRENTISS. *Amer. Jour. Med. Sci.*, April, 1882.

The patient was a man, 31 years of age, who had suffered from chronic purulent inflammation of the middle ear. There was a chill, followed by fever and violent pain in the right ear and in the same side of the head, and the usual symptoms of pyæmia. He died on the thirtieth day of the disease. On autopsy a number of small abscesses (infarctions) were found in the lungs. There was a small abscess in the ant. lobe of the left hemisphere of the cerebrum ; membranes and ventricles normal. Dura mater over the petrous portion of the right temporal bone darkly discolored ; beneath, the bone was carious ; and an abscess was discovered which communicated, by a free opening, with the lateral sinus, which latter was filled with pus and clotted blood.

26. Acute congestion of the upper portion of the tympanic cavity and membrana tympani. By C. J. Blake. *Amer. Jour. of Otol.*, April, 1882.

The subjective symptoms of this condition are severe paroxysmal pain, without any preceding sense of fulness, etc. There is but little tinnitus, and the hearing power is slightly, if at all, impaired. The objective signs are an intense congestion of the upper portion of the *Mt*, a serous exudation in this neighborhood, a bulging of Schrapnell's membrane, and a bulging of the *Mt* as a whole.

If the *Mt* is punctured at its lower part air passes out with a hissing sound, while paracentesis of Schrapnell's membrane is followed by a serous or sero-sanguinolent discharge. This is the first stage. The second stage soon sets in, in which there is general congestion of the *Mt*, with all the usual symptoms of acute inflammation. A paracentesis of the lower part of the *Mt* at this stage gives issue to a copious serous discharge. The fact that he has observed this condition most frequently in children during an attack of measles, and during the facial eruption, leads the author to infer that it is of reflex origin, being an innervation of the vasomotor tract controlling the vessels distributed to the anterior and superior portion of the drum, from the direct tympanic branch of the carotid. Puncture of Schrapnell's membrane gives more relief than any other procedure.

27. Aspergillus in the human ear. By D. N. Rankin. *Pittsburgh Med. Jour.*, April, 1882.

Case 1.—Aspergillus nigricans in both auditory canals.

Case 2.—Aspergillus nigricans in R. auditory canal.

There was the history usual to such cases.

28. Reflex neurosis from irritation of the external auditory canal. By W. R. Amick. *Cin. Med. News*, April, 1882.

The case is related of a woman who was troubled with hoarseness accompanied with an itching in the ear. On examination of the latter, some cerumen was found lying on the *Mt.* On removal, the hoarseness disappeared. There was a recurrence of the same symptoms afterward, which were likewise relieved by a removal of the wax.

29. Rational therapeutics in purulent otorrhœa or perforating suppuration of the middle ear. By S. Pollak. *St. Louis Med. and Surg. Jour.*, May, 1882.

P. in cleansing the ear has not abandoned the syringe in favor of swabbing with cotton. His local treatment thereafter is mainly antiseptic. He uses boracic acid in powder, but prefers the borate of soda as first recommended by Dr. C. A. Todd. He also looks upon alcohol as a valuable antiseptic. He urges an attention to constitutional measures, and finds mercury a valuable remedy.

30. Aural vertigo. By C. H. BURNETT. *Phila. Med. Times*, June 3, 1882.

In this paper, Dr. B. gives the structure of the auditory nerve according to the latest investigations, and describes the various forms of vertigo attending affections of the ear—dividing them into *middle-ear*, *internal-ear*, and *central-ear* vertigo. The general conclusions at which he arrives are: That there are sensory and motor fibres in the auditory nerve; that the former are connected on the one side by means of the inferior peduncles with the cerebellum, and on the other with the nerve filaments sent to the ampullæ of the semicircular canals. Any irritation of these ampullæ nerves may be carried from any one of the three divisions of the auditory apparatus or the auditory nerve in the form of mechanical pressure, which being conveyed to the cerebellum will cause vertigo. He looks upon *Ménière's disease* as only one form of aural vertigo.

31. The mechanical treatment of suppurative inflammations of the tympanum. By H. N. SPENCER. *Amer. Jour. of Otology*, July, 1882.

S. now uses the term *mechanical* as opposed to *medicinal*, since the treatment by insufflation of powders is now frequently designated by the term *dry*—a name which he gave to his method described in vol. ii, No. 3, of the *Amer. Jour. of Otology*, and to which paper this is a supplement. Further experience has convinced the author that the old treatment by syringing and drops is much less efficacious than the plan he now follows of cleansing the ear by means of absorbent cotton on a cotton-holder, and the insufflation of powders (either boracic acid or powdered borax), or his *compression* method by means of dry absorbent cotton applied directly to the affected tissues. The mechanical method is very useful in acute stages. The cotton pressed against the inflamed parts gives support to the vascular walls, diminishing exudation, and at the same time allows the discharge to have free exit. He thinks the air douche owes much of its beneficent action to the compression which it causes;—of course treatment of the pharynx and posterior nares is not to be neglected, and general treatment is not to be overlooked where the constitution is run down.

32. Otalgia from reflex dental irritation. By D. B. DELAVAN. *Amer. Jour. of Otology*, July, 1882.

It was a case of pure otalgia, without evidence of inflammation, in the *right* ear. Diligent search failed to find any cause for the severe pain, until a dentist discovered that the second molar on the *left* side had lost its crown, while its roots were still in the jaw and covered by mucous membrane. These roots were extracted, and an abscess discovered. The otalgia then rapidly disappeared.

33. The growth of otology in the U. S., as represented by the number of patients treated in charitable institutions. By GORHAM BACON. *Amer. Jour. of Otol.*, July, 1882.

The N. Y. Eye Infirmary was established in 1820—the first one founded in America. In the 35th annual report 400 patients with diseases of the ear were treated. In 1864 the treatment of diseases of the eye and ear was separated. In 1871, 1,996 ear-patients were treated; in 1874, 2,439; in 1877, 2,679; in 1881, 2,818.

The Manhattan Eye and Ear Hospital was chartered May 5, 1869. Up to December, 1870, there were 420 ear-patients. The last annual report showed 838.

N. Y. Oph. and Aural Institute was incorporated in 1869. In the first annual report there were recorded 441 patients with ear-diseases; in the 8th report, 821; in the last report, 1,049.

The N. Y. Ear Dispensary was opened May 25, 1871. Up to July, 1873, 364 cases were recorded. During 1876, 503 cases were treated. The 7th annual report shows 874 new cases, while the last, for 1880, gives the number as 2,091, including the throat patients (we infer).

In the Brooklyn Eye and Ear Hospital there were treated up to April, 1869, when its first annual report was published, 380 patients with ear-diseases. In 1873, 664; in 1881, 1,093.

The Massachusetts Charitable Eye and Ear Infirmary was established in November, 1824. The two departments were separated in 1871. In the annual report for 1875, 2,085 ear-patients were recorded; in the last report, 2,922.

At the Out-patient Department of the Boston City Hospital, from April, 1878, to April, 1879, 327 ear-patients were cared for; in the last annual report 305 are recorded.

The Presbyterian Hospital of Philadelphia established a department for the treatment of ear-diseases on Dec. 1, 1881. No statistics are given for the one month of its existence.

The Charity Eye and Ear Dispensary of Baltimore was founded seven years ago. For the year ending April 14, 1881, 87 patients were treated.

The Newark Charitable Eye and Ear Infirmary gives in its first annual report, up to December, 1880, 826 ear-patients ; in its last report, 872.

The dispensary of the Albany Hospital for the year ending March, 1880, reports 228 new cases of ear-disease.

St. Peter's Hospital, Albany, reports from 1876 to 1880, inclusive, 266 ear-patients.

The Eye and Ear Department of Troy Hospital gives in its biennial report 107 new ear-cases.

The Buffalo Eye and Ear Infirmary, in its fifth annual report, for 1881, reports 51 new ear-patients.

The New Haven Dispensary reports, in its 19th report, for 1881, 19 ear-cases.

The Chicago Charitable Eye and Ear Infirmary was established in 1858, and for the first year treated 20 ear-patients. In the annual report for 1880, 444 cases are recorded.

This list, though far from complete, yet shows the progress of clinical otological work in this country. It is the author's purpose to make such a report each year, and asks that the reports of all institutions treating ear-diseases be sent to him.

34. Micro-photograph of a peculiar pear-shaped body found in the middle ear. By A. H. BUCK. *Amer. Journ. of Otol.*, July, 1882.

The preparation was made in 1869, at Heidelberg, and microphotographed by Prof. J. W. S. Arnold, of N. Y. These pear-shaped bodies were discovered independently by Profs. Politzer and Kessel, and described in vols. v and vi of the *Archiv f. Ohrenheilkunde.* The plate is well executed.

35. Vascular tumor (aneurismal) of the deeper part of the external auditory canal. By C. A. TODD. *Amer. Journ. of Otol.*, July, 1882.

There were pain and swelling about the left ear of a man 45 years of age, with "throbbing" noise. Near the bottom of the auditory canal and hiding the *Mt* was a small swelling resembling a furuncle. An incision was made into this, which was followed by a profuse flow of semi-arterial blood, which necessitated tamponing. On removal of the cotton next day bleeding re-commenced. When the tampon was again removed three days later there was no hemorrhage, but the swelling was of its former size, and by pressing on it pulsation was perceptible. The throbbing noise was synchronous with the pulse. Pressure by means of a plug of cotton somewhat abated the noise. The case was submitted to no other treatment, and when last seen, nearly two years after, there was some improvement in the pulsatory noise, and the sac was whiter and flatter.

36. The glossograph. Automatic stenographic machine for the mechanical transcription of human speech. *Amer. Journ. of Otol.*, July, 1882.

In this article Dr. C. J. BLAKE gives an account of the ingenious apparatus of Amedeo Gentilli. The inventor has undertaken to analyze speech, not according to its sound, but according to the purely mechanical conditions in the mouth during its production, eliminating all those conditions which are not absolutely necessary for transcription.

He finds that all necessary sounds of speech can be reduced to: (1) *ch*, *r*, *g*; (2) *sch*, *l*, *s*, *t*; (3) *e*, *i*, *a*, *o*, *u*; (4) *f*, *b*; (5) *m*, *n*, and an aspiration sound, *h*.

Of these, group 1 is formed at the back of the tongue; 2, by the tip of the tongue; 3, by a narrowing and a corresponding lengthening of the whole mouth cavity; 4, by the lips; 5, by the nose. The inventor, however, for his purposes, must transfer these movements to one accessible vertical plane, and has chosen the median plane of the mouth. Thus transferred the sounds are produced as follows:

Lifting the back of the tongue, *c̄*, *ch*, *r*, *g*, *o*, *u*.
Lifting the tip of the tongue, *c̄*, *sch*, *l*.
Lifting the whole tongue, *c̄*, *e*, *i*.
Pushing the tip of the tongue forward, *s*, *t*.
Lifting lower lip, *o*, *u*, *f*, *b*.
Sinking under-lip, *a*.
Sinking upper-lip, *f*, *b*.
Expulsion of air through nose, *m*, *n*, with accompanying tongue and lip movements.

After a number of trials of various methods, the glossograph now consists of a number of light levers passing into the mouth and resting lightly in contact with the parts whose movements it is desired to record. These movements are communicated to a corresponding series of slide-bars set in the framework of the machine. These move pointed arms to which are attached pencils whose movements are at right angles to the movement of strips of paper on which the record is made. The expulsion of the air from the nose (in *m*, *n*) requires a rather complicated apparatus. There are six levers and pencils in all, drawing parallel lines on paper. The translation must be made from the curves made by the pencils.

37. Employment of calcium sulphide in the treatment of inflammatory and suppurative aural disease. By A. RUPP. *Amer. Journ. of Otol.*, July, 1882.

Six cases are given from the service of Dr. S. Sexton, in which the calcium sulphide was employed with benefit.

38. Diseases of the ear in children. By ANTON VON TRÖLTSCH translated by J. ORNE GREEN, M.D. New York: Wm. Wood & Co., 1882, pp. 165, price $1.50.

This is an admirable translation of the article on the ear diseases of childhood contributed by Prof. Troeltsch to Gerhardt's "Handbuch der Kinderkrankheiten" in 1879.

MISCELLANEOUS NOTES.

Increased facilities for the study of Otology are afforded by several newly-established post-graduate medical colleges, namely:

(1) The N. Y. POST-GRADUATE MEDICAL SCHOOL, D. B. St. John Roosa, Professor, and Edward T. Ely, Associate Professor, of Otology.

(2) The COLLEGE FOR MEDICAL PRACTITIONERS OF ST. LOUIS, Mo., Thomas F. Rumbold, Professor of Diseases of the Nose, Throat, and Ear.

(3) POST-GRADUATE COURSE OF THE UNIVERSITY OF PENNSYLVANIA, George Strawbridge, Professor of Otology.

VOL. XI. No. 4.

ARCHIVES OF OTOLOGY.

ETIOLOGY AND RESULTS OF EXAMINATION OF FORTY CASES OF CONGENITAL DEAFNESS.

By S. MOOS, Heidelberg.

Translated by F. W. Parham, of New Orleans.

(*With a wood-cut.*)

IN the present work I intend to give a general summary of the etiology and results of examination of forty cases of congenital deaf-mutism, which have occurred in my private practice up to the beginning of the year 1882. This number is very moderate, speaking both absolutely and relatively. I might, perhaps, have stated it considerably higher, had I not proceeded very strictly in the selection of the cases. The fact, however, has hardly escaped any of my colleagues, how difficult, especially in the case of children in the first two years of life, it often is to decide whether we have to deal with a case of congenital or with one of acquired deaf-mutism.[1] Such cases—and there are not a few—I have excluded, even where several occurred in the same family.

As an example, I mention two female cousins from North Germany, regarding whom the relatives in the one case laid the blame on the forcible, but useless, extraction by forceps, resorted to at her birth; and in the other case they stated that the child had, for some time during the first months of life, held the head thrown back (abortive form of cerebro-spinal meningitis?). On the other hand, I have had no hesitation (*vide* Nos. 28 and 29 of the table), respecting two cases of double otorrhœa in the first weeks of life, in deciding in favor of congenital deafness, because the twin-sister of the father of the two children was deaf and dumb.

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[1] Even mixed cases of congenital and acquired changes in the organ of hearing occur. Compare a report of a dissection of this kind published by me in the *Archives of Ophthalmology and Otology*, vol. ii, No., 1, p. 139, etc.

Many a reader will, nevertheless, consider the number of forty cases still too small to discuss, with the help of the results of their examination, a subject which has already been repeatedly and critically discussed on the basis of many thousand cases, and by colleagues far more fitted—I only refer to the Irish statistics by Wilde.[1]

In this respect it may, perhaps, be observed that many statistical collections leave much to be desired. While, for instance, Hartmann's[2] Nassovian statistics of the year 1861 appear very valuable, he declares that the Irish statistics of the year 1861 are not quite reliable, and Mayr[3] demands for that very reason, that the usual statistics, as they are compiled from the data of the census, should be supplemented by separate medico-statistical enquiries.

From a practical stand-point, the dicussion of the subject under consideration, even with the assistance of fewer statistics, is not only justifiable but even somewhat conclusive. Concerning the separate cases which come before us, questions are often to be answered, for which statistical compilations furnish us no material whatever. For instance: whether a child, on account of a malformation of its ears, is and will remain absolutely deaf; or whether the deformity with its consequences is to be remedied; whether an operation can and may be tried, and with what success?[4]

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[1] The Census of Ireland for the year 1861, part iii; "Vital Statistics," vol. i, Dublin, 1863.

[2] Taubstummheit und Taubstummenbildung, von Dr. A. Hartmann in Berlin, Stuttgart, F. Enke, 1880.

[3] Die Verbreitung der Blindheit, der Taubstummheit, des Blödsinns und des Irrsinns in Bayern, etc. Bearbeitet von Dr. G. Mayr. Heft 35 der Beiträge zur Statistik des Königreichs Bayern, München, 1877.

[4] This question presented itself to me in my 40th case. I declined the operation, because the elder sister and a female cousin were deaf-mute, and because the other ear was normally formed, and, therefore, might possess sufficient power of hearing.

Number.	Age.	Sex.	Number of the Child.	Results of Physical Examination.	Demonstrable Influences on the Pathological Development of the Organ of Hearing.
1	4	F.	Sixth child; the five older ones hear well.	Negative.	Father intemperate. Rhachitis.
2	2½	F.	The youngest of four children who all hear well.	Papulous exanthema. Swollen cervical glands. Large ulcer at the right angle of the mouth.	Mother between third and fourth gestations infected by the father. Syphilis.
3	4	F.	The third child of four; the fourth died in the sixth month of life; the two older hearing well.	Dull appearance of the mucous membrane of both *Mtt.*	Father and mother first cousins.
4	3	F.	Second child of the marriage; the elder is in every respect healthy.	On the right side: Three spherical auricular appendages, two of which are partly torn off. Imperforate external auditory canal, indicated by a shallow depression. On the left side: A spherical auricular appendage under the lobule. No other anomaly of the auricle, etc. Cannot yet walk.	Asserted twisting of the umbilical cord 13 times around the head at birth.
5	2	M.	First child.	Negative.	Nothing demonstrable.
6	7½	M.	Fifth child; the four others being healthy.	Right ear normal. Left auricle deformed. Consists of three parts, the uppermost representing a round protuberance with normal skin and cartilaginous base, 6 *mm.* high, 1 *cm.* wide. The middle part contains almost no cartilage; is, to a great extent, only a doubling of the skin, 2 *cm* high, ½ *cm.* wide, has a slight indication of the tragus, behind which the impression of the imperforate external auditory meatus is to be felt; the third and lower part represents the normally formed lobule 2 *cm.* high, 7 *mm.* wide. The mastoid process is well formed.	Asserted twisting of the umbilical cord 13 times around the left ear at birth.
7	2½	M.	First child.	Every thing normal.	None.
8	7	M.	Only child.	Every thing normal.	None.
9	3	M.	First child.	The organ of hearing normal, but the occiput quite flat.	None.
10	2½	F.	?	Normal.	None.
11	5	M.	?	Normal.	None.
12	3	M.	Second child.	Normal.	None.
13	3	F.	Sixth child; the five older of normal hearing.	Normal.	The father is the uncle of the mother, and has a deaf-mute brother and sister.
14	1	F.	Seventh child; sister of No. 13.	Normal.	Same as above.
15	10	M.	Second child. A brother, four years older, is under my treatment for a high degree of hardness of hearing.	Normal.	Father and mother first cousins. Father hard of hearing.
16	3	M.	Fourth child.	Negative.	The oldest of the brothers and sisters, 11 years old, is idiotic; the second, 9 years old, is deaf and dumb; the third, 6 years old, hears well. The father of the children is first cousin to his mother-in-law, and suffers from chronic ottorhœa.

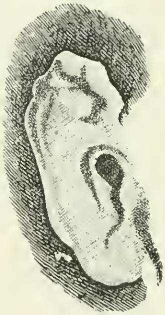
Number.	Age.	Sex.	Number of the Child.	Results of Physical Examination.	Demonstrable Influences on the Pathological Development of the organ of Hearing.
17	14	M.	Tenth child of the second marriage; six are still alive.	Negative.	Of the four dead children one was likewise deaf and dumb. From the first marriage descend three, who hear well. The conditions of relationship of the second marriage are as follows: The father of No. 17 is the brother of his present father-in-law; (the mother of No. 17 is the sister of her present mother-in-law.)
18	2	F.	Fifth child. The four older sisters and brothers hear well.	Negative.	A seven months' child.
19	3	F.	?	Scrofulous leucoma of the cornea; swollen, slightly suppurating cervical glands. Very poorly nourished.	Very scrofulous mother. Has otorrhœa of the right side. Cicatrices of formerly suppurating cervical glands.
20	3	F.	?	Negative.	None.
21	3¼	F.	Second child. One brother 6, and one 1½ years old, hear well.	Negative.	Parents are first cousins.
22	2½	F.	Eighth and youngest child.	Negative.	Four of the eight brothers and sisters are already dead. Father and mother first cousins. The father and the maternal grandmother have had each a deaf-mute brother. Also some brothers of the grandmother (on the mother's side) were hard of hearing.
23	3	F.	Eighth child.	Negative.	The third child and the seventh likewise deaf and dumb. Parents not related. Nervous diseases or affections of the ear asserted not to be hereditary in the family. Gestation and birth of No. 23 normal.
24	3	M.	?	Negative.	None.
25	4	F.	Second of the three children of one family. The eldest is 6, the youngest 2 years old. Both speak.	Retraction of the handle of the malleus. Hypertrophy of the tonsils. Pharyngeal catarrh.	None.
26	2½	M.	Thirteenth child. Besides No. 26, only two living.	Negative.	One of the 13 children, who died in the 4th year of age, could neither walk nor speak.
27	2½	M.	Fourth child. The eldest three hear well.	Negative.	None.
28	3¾	M.	First child.	Cicatrices on both tympanic membranes. (In the first weeks of life double otorrhœa.)	The father's twin-sister is deaf and dumb.
29	1½	M.	Second child. Brother of No. 28.	On both sides a thickening of the edge of the membrana tympani. Retraction of the reddened handle of the malleus. (In the first weeks of life likewise catarrh of both ears.)	The same.
30	8	F.	Fourth child of five.	Negative.	Parents are first cousins.
31	5	M.	Fifth. Brother of No. 30.	Negative.	The same.

Number.	Age.	Sex.	Number of the Child.	Results of Physical Examination.	Demonstrable Influences on the Pathological Development of the Organ of Hearing.
32	4	M.	First child. The second has normal hearing and can speak.	Entirely flat occipital region. “Besides this anomaly of the skull, there still is a distinct though scarcely perceptible paresis of the right arm and leg, which in former years was more pronounced. It was noticed in the first six months, at a time when the child became sick with a fever and was very fretful. The marked congenital talipes varus on both sides is so far improved by orthopædic treatment that the boy can walk without an apparatus. With an apparatus he can ascend the Kaiserstuhl (mountain near Heidelberg, 1800′ high). “In the circumference of the calves and of the muscles of the thigh there is no difference between the right and the left; the right leg, however, becomes more easily fatigued. “The sensibility seems to be the same on both sides; no difference in the temperature can be ascertained.”	All the relatives of the parents have good hearing. (Grandfather on the mother's side in a lunatic asylum.)
33	6	F.	Third child. The elder two of good hearing.	Negative.	None.
34	17	M.	?	The handle of the malleus on both sides appears foreshortened; membrane funnel-shaped and corrugated.	None.
35	4½	F.	?	Eczema of the auricle and auditory meatus.	The grandmother's sister has three deaf-and-dumb children: one a woman of 36 years, a son of 27 years, and another of 24.
36	3	F.	?	Negative.	The grandfather is the brother of the grandmother of No. 35. The parents of Nos. 35 and 36 are not related to each other.
37	4½	M.	?	Negative.	The uncle of the father and the fem. cousin of the mother likewise deaf-mute.
38	10	F.			
39	9	F.	Sister and brother.	See immediately below.	See immediately below.
40	3	M.			

The deaf-and-dumb family, Nos. 38, 39, *and* 40.

From the same family there are descended three deaf-and-dumb children in the second generation. The grandfather was married twice: in the first marriage to a niece; in the second, he was not related to his wife. From the first marriage descended two sons and one daughter; from the second marriage, a son and two daughters. One of these daughters was treated by me for a polypus of the ear.

With this exception, neither the children of the second marriage nor their own children (nine in all) had any disease of the ear. On the other hand, three deaf-mutes were found among the thirteen grandchildren of the first marriage. The daughter of the first marriage had among four children one deaf-and-dumb daughter, who died of typhoid fever in a deaf-and-dumb asylum in her thirteenth year. The eldest son had five children, in every respect healthy. The youngest son had among four children two deaf and dumb, a girl and a boy (the second and the fourth child). The boy had a congenital malformation of the right ear (see wood-cut.) It was $1\frac{1}{2}$ *cm.* shorter and had not much more than half the width of its fellow-ear. Helix and antihelix, also tragus and antitragus, and in a less degree the lobule, were atrophied; the entrance into the external auditory meatus perceptible, but closed by a pouch-like pseudo-membrane.



RESULTS OF THE EXAMINATION WITH REFERENCE TO ETIOLOGY.

Nationality.

Of the 40 cases, 2 were from Russia, 2 from England, 36 from Southwest Germany; among these were 28 from the grand-duchy of Baden.

The sex

was equally represented; there were 20 males and 20 females.

The age

varied between 1 and 17 years. Although it is very difficult to determine before the end of the second year, whether a child is deaf and dumb or not, yet I have entered one case of 1 year (No. 14) and one of 1½ (No. 29) among the number of congenital deaf-mutes. Neither could speak a word; both came to me in the company of elder deaf-and-dumb brothers and sisters; and, lastly, in both cases indirect heredity could be ascertained; in the one case, parental consanguinity besides. The further course of the two cases confirmed my supposition.

Additional etiological facts.

In 14 cases of congenital deafness no cause whatever, either remote or proximate, could be assigned; in 7 cases hereditary disposition was present; in 10 cases, parental consanguinity; in 3, both hereditary disposition and parental consanguinity; in 1 syphilis was asserted; in 1, intemperance of the father; in 1, premature birth (seventh month); in 1, a high degree of scrofulosis of mother and child; in 2 cases the twisting of the umbilical cord around the head, or rather around the misshapen ears themselves, was alleged as the cause of the deformity and the deaf-mutism.

Heredity and consanguinity of the parents.

Direct heredity existed in no case, whilst in seven cases (Nos. 23, 26, 28, 29. 35, 36, 37), or in 17.5 %, an hereditary predisposition could be proved; in ten cases, or 25 %, (3, 15, 16, 17, 21, 30, 31, 38, 39, 40), relationship of the parents, and in three cases (13, 14, 22), or 7.5 %, both hereditary predisposition and parental consanguinity could be ascertained.

Deaf-mutism of two children occurred in seven families, of three children in one family. In respect to the influence of relationship of the parents, case 17, and cases 38, 39, and 40 are particularly remarkable, because in these cases the fathers of the children were twice married, the one time to a relative, the other time not. From both marriages came children, *but deaf-and-dumb children only from marriages of consanguinity.*

Such facts show in a glaring light the injurious influence of the blood-relationship of the parents on their descendants, especially in the production of congenital deafness. The contrary facts brought to light by statistics deserve all credit, yet they are after all nothing but brilliant exceptions. If, to account for these exceptions, favorable social and climatic conditions are mentioned (Voisin)[1], this does not apply to the family of my last three cases (38, 39, 40), whose circumstances are accurately known to me. Their residence is such that it serves in summer as a much frequented climatic health-resort for sick and well. The dwelling leaves nothing to be desired in point of comfort and healthy situation, and the circumstances of the family are affluent.

The physician ought never to count on such exceptions; if he is consulted in a case of intended union of blood-relations, he must not refrain from warning against the same, by pointing out what consequences it may have to the offspring. This is, I think, the only thing which can be done on the part of physicians. For nobody will entertain the delusion that we shall ever succeed in passing and thoroughly carrying into effect a law which is directed against marriages among blood-relations, just as little, indeed, as we shall ever succeed in proceeding lawfully and successfully against marriages of tuberculous and epileptic persons.

Influence of syphilis and scrofula.

In case 2, the mother was infected, as was asserted by the father of the child, between the third and fourth gestations; the child itself showed a papulous eruption, swollen cervical glands, and a large ulcer at the right angle of the mouth. I did not doubt in this case that I had to do with a specific hereditary disease of the labyrinth, as the cause of the congenital deafness; my advice, however, to institute an anti-syphilitic treatment was not followed. The 19th case, also, might fall in the same category. The notes in this case are, of the child: scrofulous; very poor nutrition; swollen, slightly ulcerating cervical glands; leucoma of the cornea; and of the mother, strange to say, almost the same results of examination: has otorrhœa of the right side, eucoma of the right cornea, cicatrices from ulcerated cervical glands.

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[1] A. Voisin studied the influence of marriages of blood-relations by carefully investigating the separate families of a small community in France—Batz, (Département de la Loire Inférieure), which dwells on a peninsula somewhat secluded, and for that reason the inhabitants frequently enter into marriages with relatives, but otherwise live under favorable hygienic conditions. Among 3,300 inhabitants are forty-six marriages of blood-relations. Two marriages are childless; forty-four had 174 children. Of five women, each had one miscarriage. Among none of the 174 children did a malformation, mental disorder, idiocy, cretinism, retinitis pigmentosa occur, nor in the rest of the community. Voisin thinks that here the favorable climatic and social conditions protect the species from the degeneration consequent upon marriages of blood-relations, and that the blood-relationship of parents seems harmless to the offspring, if the parents are free from hereditary disease, of good constitution, and living under proper hygienic conditions.

Whilst they formerly generally considered scrofula as the foundation of such complicated disturbances of the senses, modern ophthalmologists, J. Hutchinson, Knapp, Kipp, Horner, and others, therein agree that almost all chronic parenchymatous inflammatory affections of the cornea complicated with disturbances of hearing are of syphilitic nature.

Influence of rhachitis.

Very probably rhachitis is an important cause of early anatomical alterations in the labyrinth. In a case examined in common with Steinbrügge (these ARCHIVES, vol. xi, p. 1, etc.) I found, besides an arrest of development in the labyrinth and the fenestræ, changes depending on rhachitic processes, which can alone form the anatomical basis of the disturbance of hearing.[1]

Brachycephaly.

In Nos. 9 and 32 of the table quite flat occiputs are noted among the results of examination of two boys, the one three and the other four years of age. Concerning No. 9, I have never learned any thing further. But no other kind of bodily disturbance could be ascertained as in case 32, and yet there must evidently have existed a considerable atrophy of the posterior lobes of the cerebrum (some of the internal convolutions) just like those two[1] remarkable cases of acquired deaf-mutism which Luys has found and described.[2]

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[1] There was, moreover, noted: father intemperate. "In the district of Cologne intemperance of the father was noticed six times; in Magdeburg, twice. Investigations made by Falk, who was twice assured by mothers, that conception had taken place in an inebriate state of the father, would hardly lead to a positive result, since here also the question must remain unanswered, how many children with unimpaired senses are begotten by inebriate fathers." Quotation from Hartmann: "Deaf-mutism and Instruction of Deaf-mutes," page 71. Yet to me the demonstration of this fact seems to be of importance. Friedreich has certainly described a number of cases of gray degeneration of the posterior columns, in which conception during intoxication was positively proved to be an etiological factor.

In the second case of Luys the question was about a woman who died of pneumonia after having been, in consequence of variola, entirely deaf from her twenty-fifth year. The left occipital lobe, wasted to a marked degree, showed an irregular atrophy of the surface. The sulcus centralis (scissure perpendiculaire) was changed into a deep furrow, so that the index finger could be laid in it. The furrow, which separated the pli courbe (lobulus tuberis) from the posterior central convolution, was also enlarged. The third cerebral convolution atrophic. The right occipital lobe in a similar manner diminished in size through absorption of the cortical substance; the sulci enlarged. The trunks of the auditory nerves wasted away to a few fibres.

According to the classical researches of Virchow, I consider it probable, that such brachy,—nay, one may say, micro-cephalic skulls, besides defective development of various parts of the brain, occasion also an atrophy of the petrous bone, in which, perhaps, is furnished the anatomical key for the cause of the congenital deafness in such cases. In the paper of Virchow[3] referred to is found the following description of a skull, No. 1232 of the Wurzburg collection:

" A distorted microcephalic skull of an idiotic woman, an inmate of the Julius Hospital. The coronal and sagittal sutures are entirely ossified; on the right the spheno-frontal, spheno-parietal, and spheno-temporal sutures totally so, the squamous suture down to the posterior portion; on the left the spheno-frontal and spheno-parietal sutures are completely obliterated. The skull is very short, in front flat and rounded, behind exceedingly defective, so that there is seen from the middle of the sagittal region to the occipital protuberance an almost entirely even surface; only in the vertex is there some compensation. The root of the nose is flat, the nasal bones are long and narrow, the maxillæ prominent, the orbital cavities high and narrow. After removal of the very thickened and heavy calvarium, the base appears very deep and atrophied, crushed in in front as well as on the sides, the petrous bones very small, and especially narrow, and the right one at its apophysis narrowed down almost like a warped leaf," etc., etc.

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[1] Besides, a yellowish discoloration and œdematous swelling; the white fibres of the brain leading to the optic thalamus resembling connective tissue.

[2] *Annales des mal. de l' oreille*, 1876; and *Gazette méd.*, No. 29, 1880. Compare Hartmann, *l. c.*, page 208; and Report on the Progress of Otology: Normal and Pathological Anatomy, July to October, 1880, by Steinbrügge, these ARCHIVES, vol. x, p. 80.

[3] Contribution to the History of Development of Cretinism and of the Deformities of Skulls. Page 994 of the "Gesammelte Abhandlungen" (collected papers), Frankfurt, 1856.

I do not at all fail to appreciate the great difference between this condition in the dead body, and my experience as regards the living; such a considerable deviation from the normal state was not present in my case; however, there *still exist for both in common the micro-cephalic condition of the skull and the smooth, flat appearance of the occipital region*, indeed, its complete absence, which Virchow has also noticed on the skull of a cretin (*l. c.*, pages 912, 913), a fact which is sufficient, in an investigation of such complicated cases of congenital deaf-mutism, to attract attention to a possible combination of atrophy of the petrous bone with certain anomalies of the skull. This is so much the more necessary as Virchow himself says (*ibidem*): "Unfortunately, there is as yet nothing that can be established concerning the beginning of the ossification of the roof of the skull."

Twisting of the umbilical cord around the head, or rather around the ears at birth. Its supposed influence on a congenital malformation of the external ear.

In the fourth case the right external ear was deformed; instead of the normal auricle there were three spherical appendages, two or which were partly torn off. At the same time, the external auditory canal was imperforate, the outer opening of which was merely indicated by a shallow depression. On the left side, under the lobule, moreover, a spherical auricular appendage was found. There was no other anomaly on this side. The three-year-old girl could not yet walk. The parents charged the deformity to the twisting of the umbilical cord thirteen times around her head at birth.

In the sixth case the right ear was normal and the left auricle was deformed. It consisted of three parts. The uppermost part had the form of a sphere with normal skin and cartilaginous base, was 1 *cm.* wide and 6 *mm.* high. The middle part contained only a trace of cartilage and presented a reduplication of the skin 2 *cm.* high and ½ *cm.* wide, with slight signs of the tragus, behind which a depression, marking the imperfect external auditory meatus, was to be felt. The third and lowest part presented the normally formed lobule, 2 *cm.* high, 7 *mm.* wide. The mastoid process was of normal shape. *The parents, strange to say, in this case also attributed the cause of the deformity of the left ear to the twisting of the umbilical cord thirteen times around the ear at birth.*

The statements of the parents, concurring in every particular—even with reference to the number of twistings in the cases,—struck me only later in looking over my journal, and if the cases had not been brought to me from places far apart, one might almost come to the conclusion that the cause asserted in the one case had been suggested by the other.

It is possible that a traditional superstition is here involved, about which I could, however, never learn any thing.

The peculiar nature of the deformity described in case 6 does not permit us absolutely to disregard the possibility of its arising from the repeated twisting of the umbilical cord around the left ear. Should the decision result affirmatively, this would have, provided we had to do with no congenital deafness, in so far a practical significance, as we might assume a normal condition, and not necessarily, perhaps, a structural anomaly, of the deeper regions of the organ of hearing, and as operative interference for the purpose of forming a canal up to the membrane of the drum would accordingly offer greater chances of success.

It will therefore be worth while to discuss, above all, the question whether with such a twisting of the umbilical cord, the child can even be born alive.

L. Fürst[1] has treated this subject more in detail. He says (*loc. cit.*, p. 318): "Besides these pseudo-products (sometimes delicate and thread-like, sometimes strong and cord-like, sometimes membranous formations), about the nature of which the most varied hypotheses exist, we have also mentioned the umbilical cord as an agent in producing compression of the fœtal parts. That constrictions of the umbilical cord, under certain conditions, are able so to strangulate the extremities that the peripheral portion wastes away or sloughs off, is established by good observers as a fact. Förster, v. Holst, Simonart, Velpeau, Cazeaux, and others, declare themselves in favor of the possibility of sloughing as a result of constriction by the umbilical cord. G. Braun, Martin, and others, answer that by so strong a pressure on the umbilical vessels, and by the disturbance of circulation induced thereby, the death of the fœtus rather than the atrophy of the constricted parts would follow, while it is denied by the other side that in the event of a constriction being produced by the umbilical cord, a complete interruption of circulation must take place in it. Against the objection that, as the knots in the umbilical cords show, the pressure upon the umbilical vessels may be considerable without thereby disturbing the circulation, it has been justly urged that in cases where parts of the umbilical cord compress each other, the pressure is decidedly weaker than where the counter-pressure of a much more resisting extremity upon the umbilical cord takes place. To bring about the destruction of an extremity by disturbing its nutrition necessitates a constantly-acting force, which exerts its influence in one place for a considerable time, while the fœtus still lives and continues its development in its uninjured parts. The umbilical cord, however, is only in a condition to do this when the counter-pressure on the vessels acts partially, *i. e.*, only on an artery, or is modified by the particular firmness of the Whartonian jelly. In most cases there will, on account of the arrest of the circulation of blood, be no time for atrophy of a constricted extremity to take place. We might therefore, perhaps, justly consider as an exception the case where the umbilical cord gives rise to such malformations, and assume that then the fault lies mostly with accompanying anomalies, which, as cord-like formations starting from the amniotic membrane, are identical with those formerly mentioned, but without direct reference to the umbilical cord. The filamentous adnexa, therefore, are the chief causes of mechanical disturbance of the development of the fœtus.

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[1] Das Amnion in seiner Beziehung zu fötalen Missbildungen. *Arch. für Gynäkologie*, Bd. ii, pag. 313, ff.

If, now, moreover, we resort to cases published, it is remarkable that, concerning the ear in general, no deformity, produced either by the umbilical cord or by amniotic threads and bands, has yet been described. In the *Monthly Journal of Gynecology*, of Busch, vol. xxxiii, page 441, Credé gives a tabular review of thirty-three cases (all up to that time known), with and without "threads," but in none of these cases a deformity of the ear existed, while, for instance, case 23 of the table shows atrophy of the eyeballs, and in the 33d case, described by Credé, many defects and deformities of the skull are found, and no anomaly of the ear is stated. In the recently published case of Ritter,[1] the question was concerning an acranius. The cause of the abnormity was the attachment of the child by too short an umbilical cord. All the soft parts and bones in a line from the third cervical vertebra to the forehead, just above the base of the skull, were cut through by the twisting of the umbilical cord; the existing soft parts and bones, and, consequently, the mutilated ears and the remains of the frontal and petrous bones, appeared directed or crowded together toward the centre of the base of the skull.

Taken all in all, the *possibility* of the origin of the *deformity of the ear on account of the twisting of the umbilical cord, appears highly improbable in a child born alive.*

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[1] The eye of an acranius histologically examined. *Archiv für Augenheilkunde*, von Knapp and Schweigger, vol. xi, part 2, p. 215.

CASE OF EXTENSIVE DISEASE OF THE TEMPORAL BONE, WITH HERNIA CEREBRI.*

By T. M. PIERCE, M.D.,

SENIOR SURGEON, INSTITUTION FOR DISEASES OF THE EAR, MANCHESTER, ENGLAND.

L. W., aged thirty-four years, married ; sallow, anxious countenance ; of average height and well developed. Has seven healthy children all living ; had one miscarriage twelve years ago. L. W.'s father is sixty-four years of age, alive and healthy. Patient's mother died at fifty-three, and for some time previously had abscesses "on the head, face, behind the ears, on the jaws, between the shoulders, and on the breast bone." Six sisters of L. W., out of nine, are alive and strong. The subject of notice has had otorrhœa of the left ear since childhood, with frequent attacks of earache. She has been in the habit of poking the ears to relieve the itching and discomfort. L. W. came to me at the Manchester Institution for Diseases of the Ear on June 1, 1881. For one and a half years previously pain in the left ear had become more severe and frequent. In May, 1881, a hard swelling in front of the left meatus, extending from the tragus over the glenoid fossa, was noticed by her medical attendant, who sent her to the institution. On examination there was seen a livid, hard, raised spot the size of a florin, situated in front of the left meatus, above the temporo-maxillary articulation, at a point corresponding with the middle root of the zygomatic process. Movement of the jaw was painful and restricted. The pus from the meatus was of a grayish yellow color, streaked with blood, very profuse and offensive. Previous to cleansing the ear the HD was $\frac{c}{72}$ inch. The TF was heard fairly at the meatus ; on the vertex, in the left ear only. The calibre of the meatus appeared enlarged. The anterior, superior, and inferior walls of the meatus were covered with a mass of large granulations concealing extensive caries. The membrana tympani contained a small perforation, which was concealed from view until the polypi were removed. There was intermittent rushing tinnitus aurium. The left Eustachean tube was fairly pervious. The patient complained of constant and severe pain over the left cheek, extending over the parietal bone to the vertex. There was no pain over the mastoid, and no vertigo or vomiting. After removing the granulations (or congeries of small polypi) with fine forceps and applying chromic acid through my perforated speculum, the probe disclosed extensive caries of all parts of the meatus up to the membrane, with the exception of the posterior wall. The HD was now $\frac{12}{72}$ inch. Leeches were ordered to the front of the tragus and over the mastoid. A lotion of

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* Read before the section of Otology, at the British Medical Association meeting at Worcester, 1882. A brief and insufficient abstract of this paper appeared in the *Brit. Med. Journal*, Oct. 21, 1882.

Zinci sulpho-carbol. gr. iv
Liq. opii extr., ʒ ss.
Liq. atropiæ, m. xv
Aq. ad ℥ i

was ordered to be instilled warm after syringing every two hours. A mixture of nitro-muriatic acid with cinchona, ter die, and $\frac{1}{4}$ grain morphia pill twice daily.

June 12*th.*—The pain and discharge were less, but the meatus was again filled with granulations, which bled freely when removed and touched with a saturated solution of argent. nit., a proceeding several times repeated since.

June 1*st.*—A lotion of

Tinct. iodi, ʒ i
Acid. carbolici, gr. iij
Liq. opii. extr., ʒ i
Aq. ad ℥ i

was ordered to be used alternately with the previous one. A mixture containing Donovan's solution was ordered, and nourishing diet. Arsenic, bichloride of mercury, and pot. iod. up to ʒ ij doses, were prescribed during the succeeding two months without checking the progress of the disease in the slightest degree. The use of Voltolini's galvano-cautery completed the removal of all granulations. The disintegration of the bony and cartilaginous portions of the anterior wall proceeded very rapidly, and the skin over the seat of the original discolored swelling was depressed with a well-marked circular edge.

Aug. 15*th.*—She had left facial paralysis; the drooping of the eyelid, the drawing up of the right side of the face, and smooth-ness of the left half of the forehead being well evidenced. The patient complained of great pain on the vertex and occiput. There was no vomiting, and the tongue could be protruded straight, though the jaw was moved less and with more difficulty. There was lachrymation of the left eye. The otorrhœa was very great, and large pieces of carious bone came away in the pus.

The pulse was 82, regular; temperature, 99° F.; the bowels were rather confined, but no nausea or vertigo.

Aug. 22d.—The condition of the patient continued the same, and she went about her housework almost as usual. The cup-like depression over the anterior wall of the meatus was now marked by a bluish brown rim, the bone and cartilage beneath the centre having completely disappeared and obliterated the temporal artery. The posterior wall of the meatus was also attacked, and the cartilaginous entrance to the meatus. The progress of the affection, which now seemed to tend backward toward the mastoid, partook of a semi-malignant character, but there was no enlargement of any glands, and an absence of any new tissue formation.

Sept. 5th.—The HD was $\frac{26}{72}$ inch. The otorrhœa was profuse, and pain at night very severe. The patient experienced increasing difficulty in taking her food and in sleeping, and was much weaker. The meatus was dressed with powdered iodoform and morphia. The patient now wished to go to her father's home, and I did not expect to see her again. The disease having completely included the area of the temporal and posterior auricular arteries, her friends were cautioned as to probable hemorrhage, etc.

Nov. 2d.—The patient returned from Sheffield. During her absence very little treatment had been carried on. The entire area of the disease had fallen in, comprising the whole of the external meatus up to the level of the membrana tympani, exposing the capsular ligament of the temporo-maxillary articulation. The auricle was completely undermined and separated in nearly its entire length behind from the mastoid process. The auricle was only slightly attached to the head above and below. The discharge was profuse, dark, and offensive. The HD was $\frac{18}{72}$ inch; the position of the membrana tympani difficult to make out.

Nov. 28th.—The ptosis of the left eyelid diminishing. Pain in head very severe, but relieved by morphia and by washing the ear with chloride of zinc (gr. ij, ad. ℥ i aq.) and opium lotion, the auricle becoming somewhat livid. No vertigo, vomiting, or hemorrhage occurred up to this date, and patient could not move the jaw sufficiently to take solid food. Particles of carious bone now came through the opening behind the auricle.

Dec. 5th.—Condyle of the ramus of the jaw exposed, the glenoid fossa and zygoma having entirely disappeared, the auricle, which was almost detached, was removed and portions from the cut surfaces and from the edge of the cavity nearest to the left eye were examined microscopically.

Jan. 7, 1882.—The area of disease was now almost large enough to admit the closed fist, and on removal of the thick pus the posterior edge of the ramus of the jaw, the nerves and muscles of the superior triangle of the neck were exposed, and the greater part of the mastoid and petro-mastoid, the ossicula, the membrana tympani, and the squamo-zygomatic element of the temporal bone, were wanting. A pulsating spot about one inch in diameter was seen at the lower part of the left parietal bone, through which, in the course of the next two days, a sac of dura mater and brain substance protruded.

Jan. 12th.—The hernia cerebri was now the size of a large hen's egg, of a reddish brown color, soft and pulsatile. The patient began to complain of pain in swallowing, and down the neck. She was extremely weak, the pulse 85, regular and feeble; temperature 100.4°. No diarrhœa or vomiting, and patient quite conscious, though suffering great pain in the head.

Jan. 20th.—Paralysis of right side, with aphasia. Ptosis of right eyelid. No loss of consciousness, but apparent improvement in the facial paralysis of the left side. Hyperæsthesia of the left side of the face, the left arm and leg. Bowels very confined.

Jan. 23d.—No moaning or pain after the attack of right hemiplegia on 20th. Patient now comatose, but no rigors or vomiting. Slight hemorrhage from the hernia cerebri.

Jan. 25th.—Died at 4 P.M. (quietly).

THE AUTOPSY, forty-eight hours after death, was made by Dr. A. Young (Pathologist to the Manchester Royal Infirmary), and was limited to the head and neck.

The destruction of tissue on the left side was found to implicate both soft and hard tissues to such an extent as to present a deep basin-like excavation. The margins were slightly infiltrated, but nowhere was there the slightest evidence of healing. The external ear and surrounding skin, for a distance of two and a half inches from the original position of the meatus, had gone; also, and to a corresponding extent, the underlying fascia. The greater part of the parotid gland, almost the entire masseter, the lower third of the temporal, and the upper and anterior fibres of the sterno-mastoid, had gone. The whole of the ramus of the lower jaw above the level of the dental foramen was also wanting. The left internal pterygoid was in great part destroyed; a few fibres, however, remained, which indicated its position and connections, whilst of the left external pterygoid its origin only remained. The longus colli, the rectus anticus, the fibres of the superior constrictor, and the left side of the atlas, were exposed at the bottom of the excavation. Higher up the squamo-zygomatic portion of the temporal bone was seen to be absent, also the major part of the petro-mastoid. The branches of the fifth nerve were exposed, and also the sheath of the pneumogastric. The mastoid was almost entirely destroyed, as also the outer end and anterior surface of the petrous. By the destruction of the latter the aquæductus Fallopii, the semicircular canals, and the carotid canal, were exposed.

The membrana tympani and ossicles had gone. The dura mater corresponding to the affected region of the cranium was thickened. The temporal bone presented a circular aperture of about 1¼ inches in diameter, through which the tip of the temporo-sphenoidal lobe of the left cerebral hemisphere protruded. The projecting mass was in a state of pultaceous softening, and of a dirty red color. Further examination of the brain after its removal showed this inflammatory softening to extend into the descending horn of the lateral ventricle, but the organ was, in other respects, free from molecular change. The floor of the cavity produced by the disease was formed by dura mater, cerebral substance, and the superior constrictor of the pharynx. Of the muscles and nerves in the region affected, the former I have alluded to, the nerve-trunks of the latter had resisted destruction, for instance, the superior dental and lingual nerves were found completely isolated as they crossed the cavity toward their destinations. The ends of the large vascular trunks, carotid, internal maxillary, etc., were found occluded by obliterative endo-arteritis. The lateral and cavernous sinuses contained small blood clots, but no signs of phlebitis could be made out. The floor and sides of the cavity showed slight superficial sloughing, and were coated with pus and débris. Nowhere did there seem to be any destruction of large sections *en masse*. Surrounding tissues showed no marked changes ; neighboring lymphatic glands could scarcely be regarded as enlarged or indurated.

Microscopical examinations of the portions of tissue removed on December 5th and at the autopsy, were made by Dr. Dreschfeld, Professor of Pathology, and by Dr. A. Young, Lecturer on Surgical Pathology, at the Owen's College, Manchester. Dr. Dreschfeld reports " the existence of granulation tissue in the sections examined by him, but no new formation."

Dr. Young also failed to find any other indications in the soft tissue, auricle, muscle, and skin, but after the autopsy Dr. Young reports : " The microscopic examination of portions of the remains of the temporal bone showed, however, a very different condition, and exhibited numerous epithelial cell-nests in the intercancellar spaces, together with cell-infiltrations. The bony trabeculæ showed evidences of rarefactive changes and, in parts, of rapid disintegration. Subsequent examination of fresh sections of the soft parts in the vicinity—including sections from the detached auricle—showed again that these tissues were absolutely free from epithelial new formation. The neighboring lymphatic glands were also examined with a similar result.

Remarks.—Cases similar to mine are very rare. From the literature on the subject, I extract the following : " Two cases of extensive absorption of the bones of the head, followed in one by hernia cerebri," by Cæsar Hawkins, F. R. S., vol. 39 of *Medico-Chirurgical Transactions*, London, 1856, page 285. In the first case quoted by Hawkins, the entire parietal, right half of the occipital, the squamous and mastoid portions of the temporal bone, part of the frontal, and the great wing of the sphenoid, the entire membrana tympani, and right zygomatic fossa were affected with caries. New bone was formed in some places. In connection with the second case quoted, Hawkins comments on the rarity of hernia cerebri from disease of the cranial bones, "because," he points out "the chronic inflammation of the dura mater so far strengthens the membrane, before the formation of the aperture in the bone has to bear the loss of osseous covering when the latter takes place.

In the second case there was a clear history of syphilis: an abscess in the hernia cerebri which discharged during life, and a thickening of other parts of the cranial bones.

The Dupuytren's Museum, Paris, No. 311 in the catalogue, contains a case of Breschet's very much like mine. The perforation is in the left temporal bone, oval from before backward, (in a man of twenty-one); is described as a sarcoma of the dura mater. The greater part of the mastoid, the meatus externus, the glenoid fossa, and the zygomatic arch were destroyed. The amount of injury to the inferior maxilla and spheno-palatine region is not clearly stated. The inner ear was unaffected, and the course of the disease was the reverse of that in my case, viz., from within outward. In the ARCHIVES OF OTOLOGY, vol. x, No. 3, a case is recorded by Dr. Kipp, in many respects similar to L. W.'s, but the signs of epithelioma were early and undoubtedly recognizable. Schwartze reports three cases of primary epithelial cancer of the temporal bone; in all, the point of origin was the mucous membrane of the tympanum. Lucæ (*Arch. f. Ohr.*, Bd. xiv, p. 127) and Delstanche fils (*Arch., f. Ohr.*, Bd. xi, p. 21) report a case each.

Similar cases to the above, as far as the extent of destruction, are quoted by Toynbee in "Diseases of the Ear," edition 1860, p. 387 etc., as contributed by Cooper Foster. "Trans. of the Patholog. Society," London, 1850; Wilde, "Treatise on the Ear," p. 206; Wishart, *Edinburgh Med. and Surg. Journal*, vol. xi; Russell, *Association Journal*, March 31, 1852. Brunner, also in these ARCHIVES, has recorded a case of epithelial cancer, with similar area of destruction.

In the case of S. W., the diagnosis at first was that of extensive caries of the external meatus, with chronic middle-ear suppuration. The fair amount of hearing and perviousness of the perforation, which continued for some time after I first saw her, precluded the middle or inner ears as the original seat of the disease. The rapid and destructive progress of the disease, which no treatment moderated, suggested a type of disease like rodent ulcer. The absence of enlarged glands under the jaw or in the neck was opposed to a carcinomatous affection. The freedom from hemorrhage, rigors, coma, or pyæmia is remarkable, considering the prolonged duration of the complaint, and the large exposed surface bathed in pus.

The origin of the disease, which resulted in such an extensive destruction of tissue, and which began a few months before the patient came to me, appeared to begin in the anterior wall of the meatus, an unusual position, and it soon involved the posterior wall, the only part not hitherto attacked. The main force of the disease was expended at first in destroying the bone and cartilage of the anterior wall of the meatus, the parotid gland, the zygoma and glenoid fossa, crippling the movement of the inferior maxilla on the left side. An arrest in the activity of the disease in that region occurred about the end of September, and the posterior wall and mastoid became the active foci of disintegration. At the same time, the destructive action extended to the ramus of the jaw, and directly inward toward the pharynx, by which the middle and internal ears were rapidly demolished, and fluid from the mouth occasionally came through the opening. The parietal and temporal regions were the seat of the later stages of the destructive process, obliterating the temporal and posterior auricular arteries, and absorbing the bony tissue, so as to produce a hernia of the brain, before the dura mater had had time to take on an inflammatory thickening in support of the meninges, or to lead to the formation of an abscess in the brain substance.

My patient was exhibited to the Manchester Medical Society on Dec. 7, 1881, as suffering from rodent ulcer, and an abstract of the case up to date was given in the *Brit. Med. Journal*, on Jan. 7, 1882. Rodent ulcer is usually limited to the upper two thirds of the face, of several years' duration, painless in middle-aged persons, rarely beginning after forty, is unaccompanied by enlarged glands, and equally allied to lupus and cancer, is usually oval or circular in shape, and has no tendency to cicatrize. My case corresponds in part only to this description of rodent ulcer, and the microscopic examinations made by Prof. Dreschfeld and Dr. Young of all the tissues except the petrous bone, were opposed to rodent ulcer. Must this case be regarded as one of phagedenic caries of soft and hard parts, dependent mainly on a strumous constitution, the dyscrasia adding its distinctive tendencies to those of the ulceration in a patient predisposed by diathesis, and enfeebled by cachexia, using the latter term as meaning a morbid constitutional state rather than a predisposition,—as Laycock puts it, " a diathesis developed into disease"? The presence of epithelioma in the petrous portion only of the temporal bone, and its absence in all the soft parts removed on Dec. 5th and at the autopsy, favor the view of secondary change (from long-continued local irritation) to a malignant character, a change which was taking place in the parts last attacked, and shortly before death.

HEMORRHAGIC PACHYMENINGITIS — PYÆMIA — ACUTE DEGENERATION OF BOTH ACOUSTIC NERVES— THROMBOSIS OF RIGHT INTERNAL AUDITORY ARTERY.

By S. MOOS and H. STEINBRÜGGE, of Heidelberg.

(Translated by A. Schapringer, of New York.)

WE are indebted to Prof. Fürstner for the opportunity of examining this case, and to Prof. Arnold for the record of the autopsy as well as for the specimens.

The following is an abstract of the history of the patient, as given by Prof. Fürstner.

"Jacob Klinger, aged thirty-four years, has been suffering from progressive paralysis for the last three years, during which time he had repeated paralytic strokes, first on the left and later on the right side. He had a severe one eight days before his death. His hearing power could not be accurately tested on account of his imbecility, but, as far as could be ascertained, it was certainly not lowered to any marked extent.

"Besides hemorrhagic pachymeningitis, there were also present hemorrhagic effusions into the pleura and the right knee.

"I cannot give a more detailed account of the history, as the case is to be published elsewhere."

Autopsy (ten hours after death).

Moderate *rigor mortis*. Extensive bed-sore over sacrum. Skin over right trochanter, on dorsal aspect of left foot, and of ball of right great toe partly reddened, partly shrivelled. Bones small. Chest broad and rather elongated. Cartilages of third and fourth ribs of right side fractured at a distance of 1½ *cm.* from their junction with the ribs; fractured ends uneven, serrated; perichondrium detached; surrounding parts infiltrated with blood and pus. Sixth rib on left side also fractured at junction of bone and cartilage. A peculiar intumescence, consisting mainly of cartilaginous tissue, found at the junction of the second rib with its cartilage.

Right lung adherent to chest-wall at the seat of fracture. There is a space filled with ichorous fluid within this adherent portion of the lung. Pleural lining studded with hemorrhagic spots. Lung tissue surrounding the cavity grayish red. The cavity communicates freely with a bronchial tube.

On the *left* side there is also an adhesion between the two laminæ of the pleura, corresponding to the seat of fracture of the rib, and also a small cavity filled with ichorous fluid in the lung tissue. Another adhesion in axillary line. Posteriorly both pleural laminæ show abundant hemorrhagic infiltrations, and thick, dark-red fibrinous deposits. The *diaphragm* the same. Upper lobe crepitant on pressure, containing a moderate amount of blood and moisture; lower lobe slightly compressed, otherwise normal.

Calvarium thick, compact, heavy, on inner surface some osteophytic excrescences. In the longitudinal sinus fluid blood. Inner surface of dura mater covered with thick, dark-red deposit consisting almost entirely of blood which can be detached in one continuous layer, and is thicker on left side than on right. Similar changes at base of skull, all the fossæ, especially those of left side, being covered with a similar mass. Yellow discoloration of *pia mater*, more noticeable at base than on convexity of brain. Convolutions, especially those of frontal lobe, markedly atrophic.

Spleen considerably enlarged, hyperæmic, soft, in some places deliquescent.

Both *kidneys* somewhat enlarged, hyperæmic, cortical substance wider than normal, turbid.

Gall-bladder very small, filled with concretions composed almost entirely of pigment. Its wall thickened. *Liver* large, hyperæmic, acini distinct, with yellowish periphery.

Contents of stomach colored with bile, crests of folds infiltrated with blood.

In the *intestines* a scant amount of fæces, mucous membrane dotted with red spots.

Lower part of cervical portion of *spinal dura mater* studded on inner surface with hemorrhagic infiltrations and deposits.

Spinal marrow attenuated, softened.

In *left maxillary articulation* a considerable quantity of pus.

Hemorrhagic infiltrations in synovial membrane, and sanguinolent exudation in cavity of *right knee joint.*

EXAMINATION OF EXTERNAL AND MIDDLE EARS.

A.—*Right temporal bone.*

Pneumatic cavities well developed, extending outwardly beyond the malleo-incudal articulation. The rest of middle ear as well as membrana tympani and external auditory canal normal, except the presence of pseudo-ligaments connecting the crura of the stapes and the tendon of the stapedius muscle with each other as well as with the wall of the labyrinth.

B.—*Left temporal bone.*

External auditory canal filled with a brownish-red mass which under the microscope proves to be composed of yellowish-brown epidermis cells. Epidermic lining of canal can be detached in one continuous mass (desquamative inflammation).

Membrana tympani. Handle of malleus not shining through. Membrane bluish. A cylindrical prominence, tapering below, in front of handle. *Microscopic examination:* Vessels of cuticular layer filled with blood corpuscles. Extravasations of blood of different sizes.

Tympanic cavity filled with whitish, yellow, sticky fluid. Bone surrounding antrum hyperæmic. *Microscopic examination:* Epithelium of mucous membrane normal; bloodvessels scarce, normal in structure; lymph-channels numerous, wide, their walls attenuated, containing colorless cells, and here and there a homogeneous, hyaline substance. The recess of the fenestra rotunda permeated by pseudo-ligaments.

Thin hemorrhagic deposit on *dura mater* covering the posterior surfaces of both petrous bones, which is continued into the internal auditory canal of right side, especially along its outer wall. Under the microscope this deposit proves to be composed of delicate, wavy, connective tissue, enclosing arachnoidal endothelial cells, newly formed bloodvessels, blood corpuscles on the point of being converted into pigment, besides a great deal of completely formed pigment (the result of old hemorrhages).

Microscopic examination of right labyrinth.

Transverse sections show the internal auditory artery to be thrombosed in different places. In the neighborhood of the entrance of the internal acoustic canal the thrombi are incomplete, while those situated in the distal portion fill the vessel completely, and are visible even to the naked eye. They are composed of red and white blood corpuscles and detritus. The branches of the artery having their origin beyond the thrombosed part are empty and surrounded with extravasations. On the inner surface of the sheath of the nerve there are two rust-colored deposits, one 3 *mm.* long, and 1 *mm.* wide ; the other, situated nearer to the tractus spiralis, 2 *mm.* long, and 1½ *mm.* wide ; both being composed of yellowish-red globules, mulberry-shaped groups of pigment cells, and numerous white blood corpuscles. In the neurilemma there are also deposits of blood and pigment. Further on toward the periphery the sections of the nerve fibres are not round but polygonal. Between the fibres are seen granular cells and numerous hyaline globules having a diameter twice as large as that of a red blood corpuscle, some even larger. In the centre of many of the sections of the nerve round or oval translucent masses can be made out, which are sharply defined by interfascicular connective tissue, and consist of detritus of medullary substance and hyaline globules. In a few instances these masses were irregular in shape, not sharply defined, and surrounded by nerve fibres in every stage of degeneration.

Microscopic examination of left labyrinth.

Bony deposit in posterior wall of vestibule. No thrombus in any artery. Capillaries well filled. In the arachnoidal sheath and between the fibres of the acoustic nerve small extravasations of blood, but no pigment. The nerve fibres on being teased break easily into fragments, producing the appearance as if the nerve had been cut into transverse sections. Otherwise the majority of the fibres are normal, and only a few show the same degenerative changes as those on the right side. There are a few small extravasations of blood between the fibres of the facial nerve. The latter is otherwise in a better condition than the acoustic nerve.

In the vestibule a yellowish coagulum is visible to the naked eye, which covers the outer wall of the utriculus, and the other walls of the perilymphatic space situated in front of it. Under the microscope it proves to be composed of a finely granular mass (albumen?) enclosing a few cells which are possibly derived from the suspensory ligaments.

The blood-vessels of the labyrinth are well filled, the blood corpuscles in the capillaries showing a polygonal form owing to compression.

In the outer wall of the utriculus and the frontal ampulla as well as in the nerve zone of the latter a small quantity of globular pigment is scattered. The nerves of the labyrinth are well preserved.

Right labyrinth.

Behind the frontal ampulla is a bony deposit 4 *mm.* in height, and 3 *mm.* in width.

No yellowish deposit visible to the naked eye can be found in the perilymphatic space of the vestibule, but on microscopic examination much coagulated lymph is detected on the outer surface of the utriculus and the semicircular canals.

Blood-vessels and pigment the same as on the right side. Nerves normal.

Numerous colorless crystals, such as rhombic or oblong plates or three-sided prisms, are found everywhere throughout the labyrinth, especially on the crista of the lamina spiralis of the first convolution of the cochlea, the prisms appearing occasionally combined, forming stellate groups. These crystals are possibly a product of the process of decalcification. On the crista of the second convolution is a rather extensive recent extravasation of blood. Every thing else normal.

Remarks.

Taking into consideration the peculiar condition of the lymphatics in the membranous wall of the right labyrinth, the supposition appears to be justified that there is a certain connection between their condition and the presence of the above-described exudation, especially as the blood-vessels are normal in every respect.

The most remarkable feature is the degeneration of the trunk of the acoustic nerve, which could have been caused: 1, by the subdural and intrafascicular extravasations of blood, some of which were quite considerable in size; 2, by the thrombosis of the internal auditory artery. The thrombi having evidently been formed only a few hours before death, showing especially no evidence of pyæmic origin, probably had little or nothing to do with the process of degeneration of the nerve fibres, which was evidently due to the extravasated blood having torn a great number of fibres and so deprived them of nutritive material. From the fact that only the central portion of the nerve was affected whilst the periphery and the terminal fibres were intact, we can draw the conclusion that the whole process occurred in the last days of life.

HISTOLOGICAL AND CLINICAL REPORT OF ONE HUNDRED CASES OF AURAL POLYPI.

By S. MOOS, and H. STEINBRÜGGE, Heidelberg.

Translated by Drs. William C. Ayres, of New York,* and Jas. A. Spalding, of Portland, Me.

(*With* 14 *drawings on tables i, ii, and iii.*)

We have quite an extended series of communications on the structure of aural polypi, and as far as the symptoms, course, and treatment are concerned, there is an extensive literature. However, in those articles on the structure of these polypi, upon which the clinical description is based, the corresponding clinical histories are almost always wanting; and we may say that the purpose of this report is to supply this deficiency. The one hundred cases are partly from our private practice and partly from our clinic.[1]

Many of the patients have been under our observation for years, and we can therefore report whether the cure was permanent or only temporary, state the manner in which relapses took place, and determine the question, what influence on healing, etc., the histological structure has; whether there will be a relapse sooner or later; and the reasons for the same in each case.

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* Up to case 84; the remainder by Dr. Spalding.

[1] We have operated on many more than one hundred cases; but one hundred cases seem to us to be most convenient for statistical purposes: many cases can not be included, since the tumors are demanded by the patients or their relatives. We have given a great many to one of our students for examination, but he has not been able to complete his work on account of sickness.

Method of examination.

The polypi were placed in Müller's fluid until they were to be examined, then in absolute alcohol for several days, and cut either free in the hand or embedded between two pieces of liver. The sections were colored with carmine, picrocarmine, or hæmatoxylin, and mounted as usual. When occasion required, they were examined in glycerine. The measurements which are recorded below all refer to hardened specimens.

CASE 1.—*Granulation tumor of the labyrinth wall.*

A man aged forty-one years had ear disease for twenty years from typhoid; for one and a half years discharge from right ear. Anterior half of drum-membrane preserved; origin of tumor, labyrinth wall; handle attached to promontory; anvil wanting. Operated May 24, 1869, and observed until Aug. 14th of the same year. Relapse nine years later. No operation. Length of tumor, 1.2 *cm.* Tumor lobulated. Microscopic examination showed it to be granulation tissue, with degenerated blood extravasations and pigment spots; epithelium mostly cylindrical, some of it ciliated. *Diagnosis: granulation tumor of the labyrinth wall.*

CASE 2.—*Fibroma myxomatosum of labyrinth wall.*

A man, aged forty years. Discharge from left ear for many years. Tumor originated from labyrinth wall, and extended to the external opening of the canal. Anterior half of the drum-membrane preserved. Extensive hemorrhage at operation. Length of hardened tumor 1.4 *cm.* Return after three months. Cured after the second operation.

It was found to be a fibroma with myxomatous portions and with decided cavernous structure at its base. Extensive parenchymatous hemorrhage; many spots under all grades of pigment metamorphosis. Rete Malpighi showed many large cells with numerous nuclei, and also confluent cones which sank into the depth of the tumor (compare fig. 3). The so-called large cells of Malpighi still distinctly to be seen in the deepest parts of the horny layer. The surface covered with cylindrical cells in places. *Diagnosis: fibroma myxomatosum of the labyrinth wall.*

CASE 3.—*Angio-fibroma of the labyrinth wall.*

A woman, aged fifty-four years. Running from the left ear for ten years, with great vertigo. A large tumor filled the external canal; operated, Aug. 9, 1872. Inferior half of drum-membrane destroyed; origin: labyrinth wall. Tumor, 1 *cm.* long and 0.5 *cm.* broad. Complete cure, with defect in drum-membrane remaining.

Structure of tumor angio-fibromatous; a large number of the vessels obliterated. Many fresh extravasations, and numerous cells containing blood corpuscles. Epithelium cylindrical. *Diagnosis: angio-fibroma.*

CASE 4.—*Fibroma of the labyrinth wall, with myxomatous portions.*

A girl, twenty-four years old. Discharge from her left ear for many years. Origin of the tumor: the labyrinth wall. Operated, Oct. 4, 1876. Dimensions: 8 *mm.* long, 3 *mm.* thick. After scraping away a caseous spot in the labyrinth wall with a sharp spoon, cicatrization occurred in eight months; almost complete destruction of the drum-membrane. The pedicle of the tumor had a cavernous structure. The upper parts were principally fibromatous, with small myxomatous portions, and with numerous small, thin-walled blood-vessels. Very many small round cells arranged in groups along the blood-vessels. Surface: cylindrical and ciliated epithelium. *Diagnosis: fibroma, with myxomatous portions.*

CASE 5.—*Fibroma of the labyrinth wall.*

A man, twenty-nine years old. Discharge from his right ear for many years. Operated, Aug., 1877. Treated until the end of Sept. The tumor had a long pedicle, and originated in the wall of the labyrinth. Length of tumor 1½ *cm.*, breadth 1 *cm.* Stroma for the most part fibromatous, with a cavernous structure of the base and a part of the centre. Numerous fresh hemorrhages. Cylindrical epithelium. *Diagnosis: fibroma.*

CASE 6.—*Granulation tumor in region of the stapes.*

A man, thirty-two years old. Discharge for many years from the right ear, with deafness. Anterior half of drum-membrane preserved. A spherical, pale-red tumor extended from the stapes region and passed through the defect in the drum-membrane. Anvil wanting. Operated, June 24, 1876. Cured end of July, 1876. Loss of taste after the operation.[1] Dimensions of tumor 13 *mm.* long, 7 *mm.* broad. *Diagnosis: Granulation tumor with myxomatous portions; cylindrical epithelium.*

CASE 7.—*Fibroma of labyrinth wall.*

A man, twenty-seven years old; discharge from his left ear for many years. A large tumor surrounded by cholesteatomatous masses sprung from the labyrinth wall. Operated, Nov., 1876; return on Jan. 2d, and in April, 1877. Size of tumor (second relapse) 11 by 6 *mm.* The tumor was made up of tough connective tissue, with but few vessels and cells; many cones passed into its body from the rete Malpighi. Horny layer. *Diagnosis: fibroma of the wall of the labyrinth.*

CASE 8—*Granulation tumor of the labyrinth wall with central cholesteatoma formation.* (Compare case 37 and drawing No. 7.)

A boy, thirteen years old; had otitis media purulenta two years ago after variola. A lobulated tumor perforated the posterior superior quadrant. Operated, April, 1878. Tumor, 1 *cm.* long, and 9 *mm.* thick. Return after two years. Permanent cure by a 25 % solution of acetate of lead.

The stroma of the tumor consisted of formative cells, and blood-vessels, which were filled partly by red blood corpuscles, and partly by proliferation of endothelium. In the centre of the sections, the cells of the rete Malpighi were partly horny and partly degenerated. *Diagnosis: granulation tumor, with central cholesteatoma formation.*

CASE 9.—*Angio-fibroma with central cholesteatoma formation, probably springing from the walls of the labyrinth.*

A man, forty-three years old; discharge from right ear for twenty years; eight polypi, some in the external canal, and some in the drum-cavity, with cholesteatoma formations; drum-membrane entirely destroyed. Operated, Oct. 30, 1876. Size of largest tumor, 12 by 6 *mm.* Cavernous structure in pedicle. The walls of the vessels very much thickened ; stroma fibrous ; many cholesteatoma patches in the centre of the tumor, as in the preceding case ; many epithelial cones from the rete Malpighi passed into the tumor, and coalesced ; a small quantity of cylindrical epithelium ; mostly flat epithelium in several layers, which showed many horny cells ; the latter were separating from the surface of the tumor. *Diagnosis : angio-fibroma, with central cholesteatoma formation.*

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[1] Compare Moos: A case of loss of taste after extirpation of a polypus springing from the region of the stapes. These ARCHIVES, vol. ix, p. 35.

CASE 10—*Granulation tumor of the labyrinth wall.*

A man, forty-two years old ; had scarlet fever at five ; since then discharge from left ear. Polyp extended to the mouth of the external canal. Later examination showed the posterior half of the drum-membrane destroyed ; handle attached to promontory ; origin of tumor in stapes region. Operated, Jan. 15, 1877. Tumor smooth, 2 *cm.* long, and 9 *mm.* broad. Cure with cicatricial healing of the defect in drum-membrane, so that on account of the objective condition he was allowed to take out a policy in a life insurance company, which was denied him before.

Stroma rich in cells and blood-vessels, with myxomatous places here and there. The surface of the tumor showed all species of epithelium, cylindrical, ciliated, and flat ; some of the last having a horny character. The same was true of the depressions in the tumor. *Diagnosis : granulation tumor of the labyrinth wall.*

CASE 11.—*Fibroma of the external canal.*

A girl, twelve years old ; never heard badly ; never had a discharge. For about two weeks she noticed that a dry, hard tumor, the size of a pea, was in the left external canal, near the outer opening ; the canal otherwise normal. The drum-membrane and hearing normal. The tumor was cut off with the polypus scissors ; no relapse ; stroma fibrous ; few blood-vessels. Malpighian cell cones sank into the tumor over the whole surface, and near the surface there were isolated so-called pearl bodies ; a somewhat broad horny layer. *Diagnosis : fibroma* (*wart ?*) *of the external canal.*

CASE 12.—*Granulation tumor of the labyrinth wall.*

A young man, aged fifteen. Discharge from left ear for many years. Drum-membrane perforated behind and below. Operated, autumn, 1877. Relapse in 1878. The tumor, the size of a bean, nodular, pedunculated, escaped on syringing, accompanied by profuse hemorrhage. Origin at posterior part of promontory. Stroma very vascular and cellular; most vessels greatly enlarged and engorged near the pedicle, the elements of the walls of some of them proliferating. Cylinder epithelium, partially ciliated. *Diagnosis : granulation tumor.*

CASE 13.—*Granulation tumors of labyrinth wall.*

A young man of fourteen. Scarlet fever with otorrhœa when five years old. There was a cauliflower tumor extending to the opening of the external canal. Bone-conduction for watch and tuning-fork. Operated, March 9 and 12, 1877. Tumors measured: the first, 2 *cm.* long and 1 *cm.* broad; the second, 2½ *cm.* long, shaped like a mushroom, ½ *cm.* at its root, and 2 *cm.* at its head; and the third, 1 *cm.* long and ½ *cm.* broad, the root of this 4 *mm.* thick. They sprang from the wall of the labyrinth. The drum-membrane was totally destroyed. Besides these there were five or six small granulation nodules in the external canal, which was very broad. The patient refused further treatment.

The tumors showed themselves to be of granulation character, very rich in blood-vessels, and with many depressions which were covered by cylindrical and ciliated epithelium. On account of a further development of these papillary formations, there were cystoid spaces, which were lined by the same epithelium. By further epithelial development inside of these spaces, there were other mushroom formations which, being deprived of nutrition, had become necrosed (compare fig. 6 and case 74). *Diagnosis : papillomatous granulation tumors* of the wall of the labyrinth and of the external canal, with *central strangulated parts of the tumor and consecutive necrosis.*

CASE 14.—*Angio-fibroma of the wall of the labyrinth.*

A man, forty-five years old. Double-sided discharge for many years. Left drum-membrane destroyed. A smooth tumor, 2 *cm.* long and 1.3 *cm.* thick, sprang from the wall of the labyrinth. Stroma hard and fibrous. Flat epithelium and horny layer. *Diagnosis : angio-fibroma of the wall of the labyrinth.*

CASE 15.—*Angio-fibroma of the external canal near the drum-membrane.*

A young man, aged twenty. Had scarlet fever at five. Left otitis media sup. and suppuration of the mastoid process with a cicatrix on same. There were polypi for many years before the operation, which was done July 14, 1874. The tumor with broad basis reached to the external opening of the canal. Its surface was smooth ; it measured 1.8 *cm.* long and 8 *mm.* thick. After the operation, the anterior and posterior walls of the canal were found to be hyperostotic. The handle remained, and was drawn inward and upward. The mucous membrane of the promontory was thick and red. Two days after the operation, facial paralysis occurred on the side operated, which was cured in three months by the use of the constant current. The discharge still continues ; sometimes copious, sometimes not so much so.

The structure of the tumor was angiomatous. Flat epithelium and sinking in of cylindrical epithelium into the tumor. Horny layer. *Diagnosis : angio-fibroma of the external canal.*

CASE 16.—*Angio-fibroma of the inner end of the external canal with bony portions, without complication of the drum-membrane or the drum cavity. Permanent cure after one operation.*

L. H., a girl thirteen years old, has suffered for several years from an aural discharge without any apparent cause. The discharge was not bloody. Besides slight diminution of hearing there was no other complication. After removing the secretion, on Aug. 11, 1875, there could be seen a large, broad, pale-red tumor at the inner end of the canal. It was upward and behind in the vicinity of the drum-membrane, and felt hard with the probe. It was removed the next day with Wilde's snare, but it was difficult to cut off on account of its hardness. Bleeding not profuse. It was, 1 *cm.* long ; the breadth and thickness of the base 6 *mm.* ; the patient left after a week, and returned Oct. 27, 1875, with a relapse. The tumor was again removed with the snare. After treatment, 25 % acetate of lead, which resulted in a cure. Drum-membrane normal, and also the hearing.

The microscopic examination showed : the greatest part consisted of large round granular cells with large and sometimes several small nuclei surrounded by a narrow zone of protoplasm. The tumor mass was extraordinarily rich in blood-vessels, very few of which showed a normal condition. Most of them were filled with proliferated endothelium or blood corpuscles, and enlarged with proliferation of the elements of the walls, in particular the perithelium.[1] When examined in cross-section, numerous radial fibres extended from the outer layer of the proliferated perithelium, which anastomosed with similar fibres coming from other vessels (comp. fig. 9). In this manner there was a net-work formed with broad and narrow meshes, in which the cellular elements formed the ground-substance. In quite a number of places these fibres reached the periphery of the tumor, and sometimes the blood-vessels would be found on the surface of the upper epithelium. Sometimes these fibres were formed into a thick, sinew-like band, when the cellular elements disappeared completely. The blood-vessels did not show this everywhere. In some places they were surrounded by a narrow band of connective tissue which contained numerous spindle cells. In some places, 1.22 *mm.* long and 1.09 *mm.* broad, the connective tissue was free from cells. Sometimes such fibre bands surrounded the blood-vessels which were undergoing destruction.

Other places showed a beginning ossification in the shape of pyramids 0.02-0.076 *mm.* broad and 0.5 *mm.* long. The bony corpuscles were mostly spindle-shaped. Carmine colored the bone much deeper than the rest of the tissue.

Besides these, mostly situated in the central parts of the tumor, there were other bony portions to be distinguished near the periphery. They were either triangular or quadrangular in form. The former measured 1.4 *mm.* in length and 0.3-0.4 in breadth; the latter 1.2 *mm.* in their longest diameter, and 0.3 *mm.* in breadth. They all showed that they were composed of ossified substance in different degrees of ossification, and were separated from each other by large cell territories. The bony ground-substance was sometimes homogeneous, sometimes lamellar. The bone corpuscles were numerous and presented all shapes of these cells. Carmine preparations same as above. To the side and toward the middle, the bony parts were surrounded by a periosteal tissue, which was connected with the fibre bands described above. The surface of the tumor, where the vessels and the fibrous net-work came to the top, was without epithelium; in other places it had several layers of rete Malpighi with a narrow horny layer. *Diagnosis: angio-fibroma with ossified portions interspersed.*

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[1] There were also isolated spherically dilated capillaries filled with proliferated epithelium.

CASE 17.—*Angio-fibroma of the left labyrinth wall. Four relapses.*

A man, eighteen years old, had a discharge in his early youth. A tumor on his left labyrinth wall the size of a pea. Operated, Dec. 13, 1870. Treated until Dec. 30th of the same year. Return of tumor in Feb., 1871. Operated on Feb. 12th, and treated until Feb. 26th. Return, April 21st, 1872. Operated on March 5th. Return, Oct. 1, 1875. Further history not known. The surface of the tumor showed comparatively narrow Malpighian layer, which sent long and short prolongations into the mass of the tumor. It was everywhere covered by a thin horny layer. The cells of the Malpighian layer sometimes coalesced, and being detached, formed small figures, as in fig. 11. *Stroma of the tumor was angio-fibromatous* (as in fig. 9). *Diagnosis: angio-fibroma.*

CASE 18.—*Angio-fibroma hæmocysticum of the external canal.*

J. P., a young man, eighteen years old, had had a discharge from his left ear for fifteen years, often mixed with blood. Examination showed a central perforation of the posterior half of the drum-membrane, covered by a reddish tumor. It was club-shaped, had a smooth surface, and attached to the posterior superior part of the canal by a broad base. Removed on Aug. 6, 1871, with Wilde's snare. Hemorrhage moderate. Length, 1 *cm.;* breadth and thickness, 8 *mm.* One half of the tumor—the inferior—was a solid mass. The upper half enclosed a kind of cylindrical space 4 *mm.* in diameter. On one side the mass which enclosed this space was $\frac{1}{4}$–1 *mm* thick, and on the other 3–4 *mm.*

The ground-substance of the lower part, in its centre, was composed of mucous tissue; in its middle and peripheric zones, of round granular cells with large eccentric nuclei, sometimes several nuclei. Between these cells were sometimes degenerated lymphoid cells. The solid parts of the tumor were rich in blood-vessels, which frequently extended up to the epithelium of the surface. The minority of them were empty, the majority filled with blood corpuscles and coagulated serum, or with proliferated epithelium.

The contents of the blood-vessels showed many different changes. The cellular contents were often fatty-degenerated, and sometimes showed a mucoid (or colloid) metamorphosis. Some vessels contained only a molecular detritus of the proliferated and fatty-degenerated endothelium. In some were only normal blood-corpuscles, or white blood corpuscles alone in fatty degeneration ; with these, also, round shining bodies 3–4 times as large, which were generally homogeneous, without nuclei, but sometimes contained one eccentric dark, granular nucleus. In some we could see an actual dehiscence from the exit of the nuclei.

The walls of the blood-vessels were partly normal, partly thickened by proliferation of their cellular elements, showing club-shaped enlargements. In the periphery of the tumor, thick and thin fibres passed off from the walls of the vessels in all directions, which came in contact with those of other vessels, and formed a network of broad and narrow meshes (see case 16). In the broad meshes were the cellular elements already described ; in the narrow ones they were replaced by fine fibres.

The walls of the cysts consisted of small concentric layers of connective tissue, The inner surface of the wall was lined with round and conical cells in several layers. Next to these, several layers of regular polyhedral cells, which had nuclei only in the deepest layers. Most of them were without nuclei, and filled with a finely granulated fatty-looking mass. The greater part of the contents of the cysts had fallen out in preparation. It consisted of singly or many-nucleated cells, fat globules, molecular detritus, numerous red and a few white blood-corpuscles.

In the outer wall of the above part, which enclosed the macroscopic spherical space, there was a round microscopic one, whose diameter was 0.218 *mm.*, and there was also a spindle-shaped space, the size of which was 0.327 *mm.* in length and 0.109 *mm.* in breadth. Its inner lining was very narrow on its medial, and somewhat broader on the lateral wall. It was made up of connective tissue, which passed over at the two poles into the connective-tissue capsule of the macroscopic space, and was continuous with it. A thin tract of connective tissue passed from one pole of the spindle-shaped cyst to the other, dividing it into two halves. The inner surface of the large space was lined with endothelial cells ; that of the microscopic, with spindle cells. The contents of the spindle-shaped cavity were everywhere a homogeneous mucous (colloid ?) mass, enclosing several varieties of cells : small and large spindle-shaped, with broad and narrow cell-bodies ; small and large, round and oval cells with from one to five nuclei. Some of all the varieties of cells showed fatty degeneration (mucoid metamorphosis of the cell-contents).

In the periphery of the large spherical space, not far from the wall, there were spaces formed by the inward development of epithelium.

The condition of the *walls of the blood-vessels in the vicinity of the cyst wall was remarkable.* Their forms were so changed that at first sight one would think of a pressure toward the periphery having exerted itself on them. It had gone so far that some of the vessels of the tumor appeared as holes or clefts lined with endothelium. Some of them were more or less filled with blood-vessels, and irregularly dilated. The amount of dilatation depended upon the time of their development, and the consequent pressure of the space toward the periphery.

The tumor was everywhere covered with an epithelium of a rather ill-defined character. It consisted of several layers composed of conical, wedge-shaped, and cylindrical cells which ran into each other. It rested on the net-work of fibrous bands from the vessels described above, or on the vessels themselves which reached to the periphery, and again on a true basement membrane which appeared in places.

In the depressions in the tumor, the epithelium was mostly cylindrical in character.

As to the genesis of the spherical space, the condition of the blood-vessels of the tumor, and also their contents, showed that it had its origin in changes in the blood-vessels themselves. We can think of two possibilities. The space could have been produced by a dilatation of a single large blood-vessel, or by many small ones whose walls had become atrophied and finally made to disappear by pressure. Against the first supposition is the fact that the space is far removed from the base of the tumor, and also its large size in comparison to that of the tumor itself.

We are not able to give the genesis of the smaller spindle-shaped space. If we consider the spherical space as a blood-vessel cyst, we can hardly declare the spindle-shaped in the same way. As a short description of the whole tumor the name *angio-fibroma hæmocysticum* does not seem out of place.

CASE 19.—*Angio-fibroma of the the left external canal.*

Mrs. K., æt. twenty-six. Had a discharge for many years. Drum-membrane perforated downward and behind ; operated, June 10, 1872. Several tumors, the largest of which, being 15 *mm.* long and 7 *mm.* broad, was examined. The stroma contained large round and oval cells, mostly containing two granular nuclei. Near the centre its structure was angio-fibromatous. The vessels were seldom filled with blood corpuscles, but often with proliferated epithelium. The portion between the vessels was occupied by bands of fibres which came from the walls of the vessels. Some of the vessels were being obliterated. The smaller tumors showed the same structure as the large one. All were covered with a cylindrical epithelium. *Diagnosis : multiple angio-fibromata.*

CASE 20.—*Myxoma of the labyrinth wall with central cholesteatoma formation.*

A. K., aged sixteen years, had discharge from his right ear for many years. A polyp sprang from the labyrinth wall. Removed, July, 1862, with the snare. Healed with perforation remaining. Size of tumor 17 by 8 *mm.* A macroscopic hole was found in the centre of the tumor, which was almost round, and another irregular one, which was oval. The interior of the spherical hole was filled up with horny cells, and the peripheric portions of the same with Malpighian cells arranged in layers. The horny parts had fallen out of the middle of the irregular hole. Its peripheric zone showed the same structure as the circular one (compare fig. No. 1). The stroma of the tumor was myxomatous ; only a few vessels in the central portions, but they were numerous immediately beneath the Malpighian layer, which covered the whole tumor. The Malpighian layer was everywhere covered with a horny layer. *Diagnosis : myxoma with a central cholesteatomatous formation.*

CASE 21.—*Angio-fibroma of the left external canal.*

A girl, ten years old. Suppurative otitis media with perforation of the drum-membrane behind and below. A tumor on the posterior wall of the left external canal. Operated, Dec. 22, 1872. Size of tumor 18 by 9 *mm.* Large round cells with small cell-body and large nuclei in the centre of the tumor. The remainder of the tumor showed an angio-fibromatous structure, with old and new collections of blood in all stages of pigment metamorphosis. Even a few hematin crystals were to be seen. The surface of the tumor was covered by cylindrical epithelium in some places; in others, by flat epithelium. *Diagnosis: angio-fibroma of the canal.*

CASE 22.—*Numerous granulation tumors from the roof of the tympanic cavity with central cholesteatomatous formation.*

V. P., a man aged twenty-four. Discharge from left ear for many years. Perforation behind and above. Many small tumors coming out of the drum-cavity. Operated, Sept. 3, 1878. Healing with perforation. Period of observation four years. The tumor was very rich in large cells with nuclei not quite reaching to the cell wall. Blood-vessels very numerous, filled for the most part with blood corpuscles, and partly with proliferated endothelium; seldom obliterated. Numerous blood spots in all stages of pigment metamorphosis. Horny layer on the surface of the tumor. *Diagnosis: granulation tumors from the upper wall of the labyrinth, with central cholesteatoma formation.*

CASE 23.—*Granulation tumor of the labyrinth wall.*

A man, twenty-five years of age. Multiple polypoid formations in the left external canal and in the drum-cavity. Drum-membrane perforated. Size of tumor (of the labyrinth) 22 *mm.* long and 13 *mm.* thick. Operated, June 4, 1874, and treated until June 22d.

The ground-substance was composed of the same cells as in case 22; very rich in vessels. There were papillomatous formations growing into the tumor from the epithelium, composed of cylindrical and flat cells. They contained blood-vessels. *Diagnosis: granulation tumors.*

CASE 24.—*Angio-fibroma of the inner and of the upper wall of the left external canal.*

A boy, fifteen years old. Discharge since childhood. Operated, April 10, 1873, and observed until April 30th. Tumor 9 *mm.* long and 7 *mm.* thick. Numerous cells in the centre; everywhere rich in blood-vessels. In the periphery the cells were replaced by a thick mesh-work of fibres, which came from the proliferated elements of the walls of the blood-vessels. The vessels were, for the most part, obliterated. Vessels anastomosed;

surface, pavement epithelium with horny layer. *Diagnosis: angio-fibroma.*

CASE 25.—*Angio-fibroma of the left labyrinth wall.*

A girl, ten years old. Discharge from left ear since childhood. Multiple polypoid formations in the drum-cavity. Operated, July 17, 1869; observed until Aug. 30, 1869. Size of tumor 10 *mm.* long and 7 thick. Stroma very rich in cells. Same cells as in the last two cases. Very rich in blood-vessels. Vessels filled with proliferated endothelium, and very much thickened by proliferation of the elements of their vessels. Many fibre bands connected with the walls of the vessels. Degenerated pigment patches. Surface, flat epithelium with horny layer. *Diagnosis: beginning angio-fibroma.*

CASE 26.—*Granulation tumor of the right labyrinth wall with central cholesteatoma formation.*

A woman, twenty-five years old. Discharge for many years; and for several months continuous pain in the depth of the ear. Drum-membrane perforated by a development from the labyrinth wall. Operated under chloroform; observed from the middle of June to the middle of July, 1878. Tumor 6 by 5 *mm.* Rich in cells. Cells the same as in case 22. A few normal blood-vessels. Many cones of Malpighian cells which communicate with one another. Central cholesteatoma. Horny layer. *Diagnosis: granulation tumor with central cholesteatoma.*

CASE 27.—*Very large granulation tumor of the right labyrinth wall. Epileptiform attacks which disappeared after the removal of the tumor.*

A man, eighteen years old. Examined in his ninth year at the clinic, Feb. 20, 1865. Found double-sided suppurative inflammation of middle ear, with destruction of the greater part of the drum-membrane; handle of the hammer drawn toward the promontory. Mucous membrane of the latter swollen and grayish red. Left, May 7, 1865. In November, 1874, epileptiform attacks with headache; increase of temperature and pulse; polypoid formation on right side; the tumor extended almost to the opening of the external canal. Operated with the snare. Nov. 24, 1874. Hemorrhage somewhat profuse. Origin of the tumor in the wall of the labyrinth. Length, 15 *mm.;* thickness, 9 *mm.;* thickness of base, 6 *mm.* Cessation of the headache and the threatened brain complication. Last seen, Feb. 17, 1875. No relapse.

Stroma very rich in cells, same as in case 22. Extraordinary development of blood-vessels, which were closed for the most part by proliferated endothelium, but seldom thickened by proliferation of the wall-elements. Here and there extravasated blood, but without pigment metamorphosis. Flat epithelium with horny layer. *Diagnosis : granulation tumor.*

CASE 28.—*Granulation tumor of the external canal.*

G. S., five-and-a-half-year-old boy. Two years before had otitis med. purulenta dext., with affection of mastoid. Abscess incised by family physician. Cicatrix of mastoid still visible. Oct. 29, 1878, heard badly for a few days before ; renewal of otorrhœa on right side ; drum-membrane destroyed. Mucous membrane of the promontory red and bleeding easily. Ordered liq. ferri perchlorati (1:5), to be diluted with water, and the ear to be syringed with it. Glands of the neck swollen on right side, Nov. 9th ; also the external canal. Stopped the iron ; warm water dropped into the ear, Nov. 23d ; polyp found in external canal. Nov. 28th, formation of abscess in right mastoid. Removal of polyp and incision of abscess on same day, under chloroform. The knife passed easily through and sank deep into the soft bone. No fever after operation. Dec. 14th, removal of a piece of necrosed bone from the mastoid fistula, and return of polyp. Jan. 25, 1878, treated again at the clinic. The pus which was behind the polyp was washed out through the fistula. *Stat. idem* until Feb. 13th, on which day the polyp came away spontaneously during syringing. Careful cleansing of the ear and wound until Feb. 26th. Numerous granulations springing from carious bone in the canal, which were removed Feb. 27th, under chloroform. On March 11th, a sequestrum, with numerous granulations attached, was removed from canal. March 18th, removal of compact secretion from the fistula, and treated until May 10th. Cleanliness of wound, fistula, and canal kept up by disinfecting lotions. Fistula closed on May 10th ; opened again on 13th, and on 15th permanently closed. June 10th, lumen of canal wider. Treated until Nov. 15th with a mixture of salicylic acid and borax. From this time, until the beginning of 1880, treated with boracic acid. The suppuration from the canal never ceased entirely. Last observation, April 31, 1881.

Stroma of tumor rich in cells and blood-vessels, and numerous Malpighian cones passing into it. Concentric layers of epidermis over the superficial parts and so-called pearl nodules (fig. 10). Horny layer. *Diagnosis : granulation tumors from a carious external canal.*

CASE 29.—*Fibroma of the drum-cavity.*

A woman, aged forty-three. Discharge from the right ear for many years. A large lobulated tumor, originating in the tympanic cavity and passing through a perforation in the drum-membrane, reached almost to the orifice of the external canal. Operated, Jan., 1878, with the snare. Length of observation two months. No relapse. Size of tumor 18 by 11 *mm.* Stroma : large, round, and spindle cells, and numerous heaps of cells around the blood-vessels ; in many places the spindle cells transformed to connective tissue, which gave the tumor a fibrous appearance near its surface. Vessels almost entirely wanting in this part ; in the rest of the tumor they were frequently obliterated by proliferated endothelium. Several layers of pavement, with occasionally a single layer of cylindrical, epithelium. There was only here and there a single layer of horny cells. In many localities the pavement epithelium sent cones into the tumor, with cholesteatoma formations in places. In the stroma of the tumor were isolated patches of black pigment granules ; sometimes disseminated, sometimes in heaps. *Diagnosis : fibroma of the drum-cavity.*

CASE 30.—*Fibroma of the external canal.*

A woman, aged twenty-seven. Discharge from the right ear for five years ; pain and hemorrhage for eight days. Tumor in the inferior-posterior part of external canal. Operated, Jan. 7, 1879, with the snare. Copious hemorrhage. Left treatment after operation. Tumor 6 by 4 *mm.* Stroma showed large round cells, with nuclei reaching almost to the cell walls. Was traversed with numerous small and large blood-vessels, few of which contained blood, the majority filled by proliferated endothelium. The wall-elements of many were also proliferated, forming fibre net-work in such places, giving, as in the former case, a fibrous appearance to the tumor on its surface. The surface showed a more or less broad Malpighian and horny layer. *Diagnosis : fibroma of external canal.*

CASE 31.—*Granulation tumor of external canal.*

A man, seventeen years old. Discharge from his right ear for six months. Polyp behind and above at the inner end of the canal ; drum-membrane perforated behind and in front of the hammer ; the latter was preserved. Operated with the snare, Nov. 12, 1878. Copious hemorrhage. Commencement of a relapse Dec. 10th. Treated with alum and acetate of lead. Size 9 by 5 *mm.* Very rich in round and oval cells, and many unchanged blood-vessels. The surface had a single layer of cylindrical epithelium with numerous depressions which give it a ragged appearance. *Diagnosis : granulation tumor of canal.*

CASE 32.—*Granulation tumor of external canal.*

A man, twenty-eight years old. Had an acute inflammation of the middle ear eight years ago. Discharge until Oct., 1875. Return of pain on right side and formation of an abscess in the right mastoid. Abscess opened. In the course of the year 1876, fistula remaining open, increase of secretion, and attacks of vertigo. Trepanation of the mastoid at the surgical clinic without complete cure. Visited the aural clinic, Aug., 1876, when the wound in the mastoid was not yet closed, and discharged pus on pressure. Further examination showed perforation of the wall of the canal, with granulations around the perforation. Perforation of drum-membrane in its posterior-superior quadrant, with granulations coming from the middle ear. The tumors were removed with the snare, and the remains treated with lapis. In syringing the mastoid, water passed into the canal. A sound could be passed 3.3 *cm.* into the fistula. By Politzer, air comes out of the fistula. Granulation returned in the middle ear, Oct. 5th and Nov. 2d. Removed again with the snare. In the meantime vertigo, vomiting, and pain in the right side of the head without chill or fever. Nov. 2d, pulse, 76 ; temp. 37.2°. Loss of appetite. Tongue coated. External canal and mastoid still communicate in syringing, Nov. 13th. After removal of the granulations with the snare, the discharge decreased ; otherwise *stat. idem.* Patient left until Dec. 13, 1878. Return on this day with a new abscess in his right mastoid with two fistulæ ; also multiple granulations in the canal and middle ear. Said that the old cicatrix on the mastoid gave way fourteen days before. After removing a large tumor (which was examined) from the external canal, and two which were attached to a sequestrum from the anterior wall of the mastoid, the old scar on the mastoid was opened down to the bone, in order to establish a free communication between the mastoid and the external canal (done under chloroform). He again left treatment at this time. Size of tumor 13 by 6 *mm.* Stroma rich in cells and blood-vessels ; the latter stopped up in many places by proliferated epithelium ; numerous central cholesteatomata and degenerated pigment patches. Rete Malpighi with horny layer. *Diagnosis : granulation tumor.*

CASE 33.—*Angio-fibroma of the labyrinth wall.*

A man, forty years old. Discharge from his left ear for many years ; perforation of the drum-membrane ; tumor springing from the labyrinth wall ; operated with the snare, Oct. 8, 1879. Cure with hole remaining in the drum-membrane after three weeks' treatment. Last seen, end of Oct., 1871. Size of tumor 9 by 6 *mm.* Stroma rich in cells and blood-vessels. Latter often filled by proliferating endothelium. Proliferation of the walls, and thickening by new-formed connective tissue. Fibrous bands pass out from the walls, and sometimes anastomose. Isolated pigment patches. Malpighian and horny layers. Cylindrical epithelium in places. *Diagnosis : commencing angio-fibroma.*

CASE 34.—*Myxoma.*

A girl, ten years old. Discharge from right ear for five years. Multiple polyps ; some in canal, some in middle ear. Operated on, July 23, 1873, under chloroform. No return. Observed until Nov. 1, 1873. Only the larger tumor (14 by 11 *mm.*) from the canal was examined. It consisted for the most part of myxomatous tissue. Many metamorphosed blood extravasations. Pavement epithelium of many layers on the surface, and many chains of non-nucleated cells which were detaching from the surface. Cylindrical cells in the depressions of the tumor. *Diagnosis : myxoma.*

CASE 35.—*Granulation tumor with horny layer.*

A girl, six years old. Had scarlet fever in April, 1878 ; unconscious for fourteen days ; convulsions during the latter part of her unconsciousness. Discharge from her right ear, which was said to have continually decreased. The external canal was shut off from the deeper parts of the ear by a thin funnel-shaped pseudo-membrane, which was perforated in its centre. There were granulations interior to this membrane, which were removed with a snare on Feb. 3, 1880, and afterward several times cauterized with galvano-cautery. A free exit of pus was thereby established, and the probe could be inserted through the opening in the pseudo-membrane. After-treatment consisted of a 10 % solution of acetate of lead, and cleansing the ear partly with boracic acid and partly with salicylic wadding ; the latter was carried through the hole in the pseudo-membrane. No return of the tumor. Two years after there was still discharge, and the membrane was in the same condition as before. *Diagnosis : granulation tumor with horny layer.*

CASE 36.—*Granulation tumor with horny layer.*

A boy, ten years old. Discharge from the ear for several years ; tumor originated from the right labyrinth wall. Operated with the snare, under chloroform, Mar. 11, 1879. Size 9 by 6 *mm.* Stroma rich in cells and vessels ; many Malpighian cones passed into the tumor body. Horny layer on the surface. Numerous degenerating blood extravasations. Relapse in fall of 1881. The large tumor, which reached almost to the external orifice of the canal, came away spontaneously after nine applications of a 25 % solution of acetate of lead (ten drops of acetic acid added). *It was perfectly black ;* no hemorrhage. No return up to his last visit, Mar., 1882. The microscope showed the stroma rich in cells and vessels. *On the surface were collections of black granules* (*sulphate of lead*) *; the vessels were all filled with blood corpuscles, which adhered to each other, and their forms correspondingly changed. The cells of the tumor were notched and shrunken, with nuclei often indistinct.* (The result of the medication.) *Diagnosis : granulation tumor with horny layer.*

CASE 37.—*Angio-fibroma with partial ossification and central cholesteatoma. Polyp originating from the labyrinth wall of left ear. Operation. Four years later retention of pus* (*caries ?*). *Three weeks after the operation, return of the tumor; death after the appearance of intense pain, delirium, and loss of consciousness. No post-mortem. Supposed cause of death, cerebral abscess.*

Mrs. C. P., aged sixty-five, first appeared Oct. 22, 1874. She had had a painless discharge from her left ear for several years.

There was a polyp from the labyrinth wall, which was removed by the wish of the patient. She was satisfied with the result, and returned to the clinic four years later, July 13, 1878. She then complained of a severe pain in the depth of the left ear, which had been incessant for three weeks; also of noises in the same ear, and vertigo. Functional examination showed total deafness in the left ear for air- and bone-conduction; yet she said she could hear the watch on contact. There was a pale-red tumor which filled the canal; it was covered with pus. The tumor was removed with Wilde's snare; moderate bleeding. The polyp was hard, and measured 10 by 5 *mm.* Syringing removed thick pus and epithelial cells.

July 16th, patient visited the clinic the last time. She had continuous pain in the left ear, which radiated toward several points of the skull. Sick at the stomach, and constipation for three days. External canal constricted in its centre; pain on pressure on the tragus. Ordered lukewarm water; two leeches on the tragus; ice applications to the head; and two doses of calomel and jalap. Later, obstinate vomiting, evacuation of bowels, cessation of headache, but continuation of pain in the ear.

July 21st, vomiting ceased; one stool; patient delirious and unconscious. The pupils equally contracted; pulse, 100, and weak; temperature, 37.4°. External canal swollen; return of polyp; slight discharge. Used catheter and syringed the ear. Ice; calomel. She was conscious during visit, but a few hours after, delirious, and unconscious, which lasted for a whole week. No stool during the time.

July 26th, temperature, normal; pulse, 120. Pupils, same. No vomiting, nor stool. Ear same as before. Ordered ice, calomel, 0.2., three doses. These symptoms having continued up to Aug. 3d, she died. *Post-mortem* refused.

The tumor consisted for the most part of Malpighian cones, which went into it from the surface; in the centre these cells had degenerated to a cholesteatomatous mass (compare fig. 7). Other parts of the tumor, *e.g.*, the superficial portions, showed a fibromatous structure; the ground-substance, composed of large round cells, between which were the capillaries filled with blood, and endothelial cells. They were in the form of a net-work, with narrow meshes, some of which could be followed to the perithelial sheath of the neighboring vessels, where they passed into them with widened calibre. The middle of the tumor had further characteristics, as: *a*, blood extravasations in the different stages of pigment metamorphosis; *b*, several places of ossification. The greater part of the extravasations showed mulberry-shaped red globules, which resembled hæmoglobin. They sometimes appeared as if they contained red blood corpuscles, sometimes black, granular, or diffused pigment, and less frequently oblique, rhomboid, brownish-red or brick-dust colored columns. At rare intervals there were spindle or star-shaped pigment cells. In some sections the pigment could be found in the Malpighian cells up to the topmost layer. Notwithstanding the extensive deposits of pigment, only in the great minority of the numerous sections could a blood-vessel be found in the vicinity. In the new-formed bony tissue two separate zones could be easily distinguished. The inner measured (in eight sections) on the average, 0.26 by 0.095 *mm.* In carmine preparations it contrasted with the surrounding parts by a more intense coloring. The ground-substance was homogeneous; the bone corpuscles were star-shaped in the middle, and some in the periphery were round, spindle-shaped, or oval. This inner zone showed a zig-zag contour around its whole periphery. External to this was a narrow pale-red zone, with round and oval cells, impregnated with salt solution, to be recognized. Around all of this was a layer of spindle cells, which separated it from the rete Malpighi above, from the cones to the sides, and from the blood extravasations below.

As to the formation of bone, we can imagine two possibilities. The tumor originated from the mucous membrane of the labyrinth wall. Since this plays the part of periosteum, it is possible that when hyperæmic it formed bone directly. Against this idea is the small quantity of bony tissue, and also the fact that polyps originate here most frequently, and bone should therefore be oftener observed.

More probable is the theory, that we had to deal with a heteroplastic new formation, and a bony formation from connective tissue, or from a part of the ground-substance.

The whole tumor may be described as an *angio-fibroma with central cholesteatoma and partial ossification.*

CASE 38.—*Granulation tumor of the labyrinth wall.*

A man, twenty-one years old, had discharge from both of his ears since his sixth year. Said it came after convulsions. A tumor from the right labyrinth wall was removed with the snare on April 29th. Size 5 by 4 *mm.* After-treatment: galvano-cautery, and acetate of lead (10 % left, 20 % right). Cessation of discharge, May 10th. *Diagnosis: granulation tumor with cylindrical epithelium.*

CASE 39.—*Myxoma of right labyrinth wall.*

Young man, aged seventeen. Discharge from right ear for many years. Large tumor springing from wall of labyrinth. Operated, May 25th ; last seen, June 21, 1874. Size 16 by 8 *mm.* *Diagnosis : myxoma with Malpighian and horny layers.*

CASE 40.—*Angio-fibroma of external canal.*

A girl, sixteen years old. Aural discharge. Said she heard badly only with the right ear. Tumor at the inner end of canal, above. Perforation of drum-membrane in the centre. Marked hypertrophy of tonsils. Tumor and tonsils operated, Nov. 27, 1877. After-treatment : partly cauterization, partly acetate of lead up to middle of Jan., 1878. Size of tumor 6 by 4 *mm.* *Diagnosis : angio-fibroma with horny layer.*

CASE 41.—*Granulation tumor of labyrinth wall.*

Young lady, twenty-seven years old. Discharge from right ear for several years. Drum-membrane perforated. Tumor from wall of labyrinth. Operated with the snare, July 17, 1872. Size 6 by 6 *mm.* *Diagnosis : granulation tumor with Malpighian and horny layers ; cylindrical epithelium in places.*

CASE 42.—*Granulation tumor of left tympanic cavity.*

A man, aged twenty-eight. Discharge from left ear for many years. Multiple polypi in the drum-cavity. First operation, May 22, 1868. Relapse. Operated, July 22, 1872. Tumor 8 by 6 *mm.*, with many vessels stopped up by proliferated endothelium, Malpighian and horny layers.

CASE 43.—*Granulation tumor with central cholesteatoma.*

A girl, twelve years old. Discharge from left ear since childhood. Drum-membrane destroyed. Tumor springing from labyrinth wall in front of the stirrup. Operated, July 16, 1872. A return two years later. Operated repeatedly. Typhoid in 1876.

Frequent returns ; operated, Aug. 6, 1877, and observed until Aug. 12, 1877. On July 20, 1878, relapse. Operated with the snare. After-treatment : galvano-cautery, and 25 % solut. pb. acet. Observed until Oct. 9, 1878. Size of tumor examined, 9 by 5 *mm.* The sections show, macroscopically, a defect 2-3 *mm.* broad, caused by falling out of a mass in preparation. The remaining mass consists of Malpighian cells with nuclei, which, however, color but slightly with carmine. (Beginning cholesteatoma formation.) The ring which surrounds the mass was composed of granulation tissue, with a Malpighian and horny layer. There were numerous degenerated blood extravasations in the stroma.

CASE 44.—*Two tumors: 1. Granulation; 2. Angio-fibroma (return after three years).*

A man, twenty-two years old. Double-sided discharge for many years. Perforation of the drum-membrane, and polypoid formation from right labyrinth wall. Operated with the snare, Mar. 2, 1873. Size 11 by 7 *mm.* Granulation tumor with proliferated endothelial and adventitia cells ; narrow horny and Malpighian layers. No after-treatment. Return in spring of 1876. Tumor 15 by 7 *mm.*; angio-fibroma with cylindrical epithelium, and great depressions of same, producing lobular structure. No after-treatment.

CASE 45.—*Granulation tumor with beginning cholesteatoma.*

A man, forty-five years of age. Discharge from left ear for ten years ; large central perforation of drum-membrane. Polyp of labyrinth wall. Operated with the snare, June 7, 1868. After-treatment : cauterization, and powdered alum and solution of alum, up to June 30, 1868. Return in April, 1872 ; operated, April 9, 1872. Size 12 by 7 *mm.* After-treatment to June 29, 1872 : acetate of lead. Ground-substance rich in cells, with isolated myxomatous patches ; rich in large blood-vessels filled with blood, and showing some proliferation of endothelium and adventitia. There were many round and oval cavities with thick walls, formed by communicating concentric cells, while the cells in the centre were in the stage of retrograde metamorphosis. (Beginning cholesteatoma formation.) The surface of the tumor, composed of two layers of cells with sharply defined contours. *Diagnosis : granulation tumor with beginning cholesteatoma formation.*

CASE 46.—*Granulation tumor of the labyrinth wall.*

A boy, eleven years old. Discharge from right ear for five years after measles; polyp of labyrinth wall. Operated, July 2, 1878. Size 8 by 6 *mm.* Granulation tumor with horny layer. (Compare fig. No. 8, and text thereto.)

CASE 47.—*Granulation tumor of the right drum-cavity.*

A man, sixty-four years old. Double-sided discharge from middle ear with perforations. Multiple polyps in the drum-cavity on both sides. One tumor of right side 11 by 6 *mm.* The layer removed when patient left treatment. *Diagnosis: granulation tumor with horny layer.*

CASE 48.—*Secondary syphilis. Double-sided otitis med. pur. with perforation. Polypoid formation. Inflammation of the right labyrinth. Healing with cicatrix, and return of hearing totally lost on right side. Fibroma of labyrinth wall.* (*Syphiloma.*)

T. L., a man, thirty-two years of age. Complained on July 9, 1877, that he had had a discharge from his left ear for eight days, which he said appeared after a cold bath. Examination showed a pale-red polyp at the inner end of the canal in front and above. It was treated for a few weeks with alum and a solution (10%) of acetate of lead, which caused it to disappear. The patient had indolent buboes, and also psoriasis in the hands and on the scalp. In April, 1878, he had syphilitic angina, two months after the discharge from his right ear had begun.

On Apr. 15th, a pale-red tumor could be seen in the right canal. Hearing was lost on the right side, and all bone-conduction for tuning-forks. The tumor was removed with the snare, April 23d. After-treatment: mercurial inunctions and infusum spec. lign.; locally, 10–15% plumb. acet. On July 11th the eruption and angina had disappeared, but the discharge still continued; the greater part of the drum-membrane was wanting; hammer-handle portion preserved; the mucous membrane of the labyrinth wall covered with blood and pigment. July 17th, profuse, thick, offensive discharge. Liquor ferri perchlor. Aug. 28th, discharge very scant. Alum. Sept., liq. ferri. Oct. 2d, only a part of the promontory the size of a pea was suppurating. Acetate of lead, 10%. Nov. 5th, right ear, *stat. idem.* A new eruption over the whole body and face and scalp. Rhinitis with slight loss of tissue at the entrance of both inferior nasal passages. Iodide of potash. Dec. 9th, general disease, and also ears much better. Iodide continued.

January 20, 1879, cure with cicatrix and attachment to the promontory. Speech, ⅓ metre; bone-conduction for C and C^1, not for a^1; the last, 2 *cm.* by air. Acoumeter by air-conduction, 0.05; by air- and bone-conduction in the beginning of March, 0.13; speech, 1½ metre; bone-conduction now also for a^1. Return of the eruption on May 23d, without any bad effect on ears. Mercury again, and apparent cure of the general disease, May 22, 1880. A slight anginous difficulty without any specific symptoms. Hearing, right: whisper at 4 *m.* Gargle with iodide of potash containing iodine, June 4th; hearing, 6 *m.* for whisper.

Size of tumor, 1 *cm.* by 7 *mm.* The stroma was composed of thick wavy bands of connective tissue, with small round oval and spindle cells with small nuclei. Toward the periphery the stroma was changed to a net-work, with narrow meshes made by the cement substance between the Malpighian cells; whole protoplasm had for the most part fallen out. The tumor had not many blood-vessels. Where the vessels were found, there were proliferations of perithelium, and accumulations of cells in their vicinity. *Diagnosis: fibroma of the labyrinth wall.* (*Syphiloma.*)

CASE 49.—*Angio-fibroma of external canal.*

John H., æt. twenty-nine, consulted us January 29, 1877. Had discharge from his right ear since his youth. Apparent cessation of same. In the last three months, acute inflammation of the anterior part of the mastoid and the neighboring part of the canal, with acute caries and osteoporosis of the latter, and also a part of the annulus tympanicus. Multiple polyps on the under anterior wall of canal. Enormous quantities of cholesteatomatous masses in the inflamed spaces. Serious brain symptoms. Complete cure, with a remaining defect in the canal and loss of the anvil. Partial return of hearing.[1]

Tumor rich in cells, and covered by a single layer of horny epithelium. Few of the vessels filled with blood; most of them with proliferated endothelium. Extensive proliferation of the perithelial sheath, and occasional anastomosing fibrous bands. *Diagnosis: beginning angio-fibroma.*

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[1] For a complete history of this case, see these ARCHIVES, vol. viii, p. 231. S. Moos, "Four Cases of Disease of the Mastoid." Case 1.

CASE 50.—*Angio-fibroma of left labyrinth wall.*

A man, thirty-four years old. Discharge for many years; drum-membrane destroyed; tumor, 7 by 6 *mm.*, springing from left labyrinth wall. Operated, January 24, 1870. No relapse. Ground-substance angio-fibromatous. Malpighian and horny layers. The cells were cholesteatomatous in the depressions of the Malpighian layer. *Diagnosis: angio-fibroma with central cholesteatoma formation.*

CASE 51.—*Granulation tumor on right side, in region of the stapes.*

A man, nineteen years old. Discharge since childhood. Anterior half of drum-membrane destroyed. A tumor, 8 by 6 *mm.*, springing from stapes region. Operated, May 23, 1872. Discharged cured (with defect remaining June 18, 1872). Granulation tumor with horny layer; proliferation of endotheliun of blood-vessels, and degenerated blood extravasation. *Diagnosis: granulation tumor.*

CASE 52.—*Granulation tumor of the labyrinth wall.*

A man, twenty-two years old. Discharge from right ear for many years. Perforation in the superior posterior quadrant; origin of tumor, stapes region. Operated, April 15, 1879. Size, 9 by 8 *mm.* Six days after the operation, had erysipelas capitis, and later, meningitis and nephritis. Healing, with perforation remaining. Structure of tumor as in case 51, with a proliferation of the elements of the walls of the blood-vessels.

CASE 53.—*Angio-fibroma of the labyrinth wall.*

A man, twenty-four years old. Discharge from both ears since childhood. Destruction of inferior half of drum-membrane. Tumor of the labyrinth wall. Operated, July 26, 1876. Size, 9 by 6 *mm.* After-treatment for three weeks: acetate of lead. Said he had a discharge five years later without formation of polypi. Successful treatment with boracic acid. Typical angio-fibroma with horny layer.

CASE 54.—*Spontaneous elimination of a granulation tumor of the labyrinth wall, with fatty degeneration of its pedicle.*

A boy, six years old, consulted us in March, 1873. A large tumor, which filled the external canal, came away by syringing, without much bleeding. It originated in the labyrinth wall. Greater part of drum-membrane destroyed. Size of tumor, 13 by 9 *mm.* Granulation tumor with Malpighian and horny layers. The majority of the Malpighian cells fatty-degenerated. There were numerous patches in the pedicle of the tumor under fatty metamorphosis, showing fat-granules, fat-globules, and cholestearin crystals. The blood-vessels everywhere filled with blood corpuscles.

The spontaneous detachment of the tumor was evidently caused by the fatty degeneration of the pedicle.

CASE 55.—*Granulation tumor of the right drum-cavity.*

A man, twenty-four years of age. Discharge from his right ear for many years. Consultation, May 17, 1875. A tumor, 9 by 6 *mm.*, which sprang from the labyrinth wall, came away spontaneously while syringing; bleeding. Patient not seen after. *Diagnosis: granulation tumor with horny layer.*

CASE 56.—*Granulation tumor with formation of bone.*

A boy, three and a half years old. Chronic otitis media purulenta for one and a half years. Complete destruction of drum-membrane. Caries with polyp. Inflammation of the membranous labyrinth. Meningitis. Abscess in right lobe. *Diagnosis: granulation tumor, with numerous disseminate bony formations, derived from the cells of the tumor, consequently of a heteroplastic nature.*[1]

CASE 57.—*Angio-fibroma of labyrinth wall.*

A man, twenty-two years old. Discharge from his left ear for many years. Operated, Feb. 20, 1871. Origin of tumor, the left labyrinth wall. Size, 5 by 5 *mm.* No return up to the last visit, Nov. 22, 1874. Tough tumor with few blood-vessels; horny layer. *Diagnosis: angio-fibroma.*

CASE 58.—*Beginning angio-fibroma of labyrinth wall.*

A boy, sixteen years old. Discharge from his right ear for many years. Tumor from the labyrinth wall. Size, 4 by 7 *mm.* Return, one year later. Centre of tumor rich in cells; the rest of it fibrous. Horny layer. *Diagnosis: angio-fibroma of the labyrinth wall.*

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[1] For complete history, see Moos, "Contributions to the Pathology and Pathological Anatomy of the Organ of Hearing," these ARCHIVES, vol. iii, pp. 2 and 173.

CASE 59.—*Beginning angio-fibroma of the external canal.*

A young man, eighteen years old. Acute inflammation of the mucous membrane of his right drum-cavity, with total loss of the drum-membrane during scarlet fever. Later it became chronic. Chronic inflammation of the cells of the mastoid, with numerous fistulæ in the bone, and multiple polyps in the external canal on its posterior inferior wall. Total loss of hearing. Neuralgia supra-orbitalis dextra, with occasional feeling of formication in the right arm and leg, with clonic spasms of same. Permanent relief of the nervous symptoms after deep incision into the mastoid process and removal of the polyps. Most of the latter were removed with Toynbee's lever-ring forceps, only a few being brought away with Wilde's snare. After the removal of the polyps the drum was seen to be totally destroyed, and the ossicles were missing. The drum-cavity and the canal formed one large space without any line of division. Mucous membrane of the drum-cavity thickened and red.[1]

The tumor was cellular, with many fibromatous places. *A beginning angio-fibroma of the external canal; Malpighian and horny layers.*

CASE 60.—*Fibroma of labyrinth wall.*

A cigar-maker, nineteen years of age. Discharge from his right ear for seven years. External canal filled by a large lobular tumor, which was found later to have sprung from the labyrinth wall, with a broad base. Operated, Feb. 14, 1880. Size, 21 by 12 *mm.* After-treatment until March 20th, with galvano-cautery and concentrated solutions of acetate of lead. No return. Stroma fibromatous, with myxomatous places. Several isolated cysts (for the genesis of which see case 13), whose cells were under retrograde metamorphosis. Cylindrical epithelium. *Diagnosis: fibroma of the labyrinth wall.*

CASE 61.—*Angio-fibroma of the labyrinth wall.*

A woman, forty-three years old. Had an abortion fifteen years ago, and discharge from her right ear since then. Operated,

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[1] For complete history, see *Virchow's Archiv*, vol. lxviii, on the connection between the diseases of the ear and those of the trigeminus, by S. Moos.

April 2, 1880. Size of tumor, 15 by 6 *mm.* Origin : labyrinth wall : Refused after-treatment. Numerous round and spindle cells in the vicinity of the blood-vessels. Fibrous band passed out in all directions from the vessel-walls, which on account of their size and number gave the tumor a fibrous appearance. Surface of tumor covered by Malpighian and horny layers. *Diagnosis : angio-fibroma of the wall of the labyrinth.*

CASE 62.—*Fibroma of the labyrinth wall.*

A boy, fourteen years old. Discharge from his right ear for nine years, after scarlet fever. Operated, April 3, 1880. Left treatment after the operation. Tumor lobulated ; sprang from the wall of the labyrinth. Size, 15 by 7 *mm.* Stroma, for the most part, fibromatous ; isolated myxomatous places in the centre. Malpighian and horny layers. *Diagnosis : fibroma of the labyrinth wall.*

CASE 63.—*Fibroma of labyrinth wall.*

A girl, twenty-two years old. Discharge from her right ear since two years old. Double polypoid formation. Origin : labyrinth wall. Operated, Aug. 31, 1880. Size of tumors 16 by 10 *mm.*, and 7 by 6 *mm.* Copious bleeding after operation. Treated until the end of Sept., 1880. Structure of tumor same as case 62, with the exception that there was a cylindrical epithelium. *Diagnosis : fibroma of the labyrinth wall.*

CASE 64.—*Fibroma or the external canal, complicated with a cholesteatomatous perforation of the mastoid.*

A woman, nineteen years old. Came, Aug. 22, 1879. Had ear trouble on her left side since six years old. Repeated opening of abscesses in the region of the mastoid. Aug. 23d, opened the covering of the mastoid and removed a large cholesteatomatous mass from the mastoid cavity (see *Zeitschr. f. Ohrenheilk.*, vol. ix, p. 137, *et. s.*). Operated a polyp on the posterior wall of the canal with the snare on the same day. Still remains under observation. Healed with a large hole, which is open outward, and communicates with the drum-cavity and external canal.

The tumor had a pedicle, and was 1½ *cm.* long and 6 *mm.* broad. *Diagnosis : fibroma with numerous parallel Malpighian cones, with a narrow horny layer on its surface.*

CASE 65.—*Fibroma of the labyrinth wall.*

A man, forty-four years old. Double-sided otitis med. pur. chronica of unknown duration. Admitted, Feb. 18, 1882, Left ear first treated. Posterior half of drum-membrane wanting. Tumor originated from the posterior half of the labyrinth wall. Treated with galvano-cautery until Feb. 28th. Removal of a portion of the tumor, March 4th, with the snare. Five applications after removal, which lasted up to March 16th. The next week, treated with boracic acid. Treated from March 23d to April 18th with a 20 % solution of acetate of lead. Complete cure with cicatrix at the end of April. Right side: large granulations on the posterior superior wall of the canal at its inner end. Defect in the anterior half of the drum-membrane. Cholesteatoma of the tympanic cavity. Healing with cicatrix after burning of the cholesteatomatous mass with galvano-cautery, and also the granulations in the external canal. After-treatment: 25 % solution of acetate of lead. May 23d, both sides cured, and patient discharged after removing both tonsils, which were hypertrophied. *Diagnosis for the tumor on the left labyrinth wall: angio-fibroma with horny layer.*

CASE 66.—*Granulation tumor of the labyrinth.*

A girl, aged twelve. Consultation, Nov. 16, 1878. Discharge from the right ear for one year; mixed with blood for a short time previous to consultation. A large red tumor filled the external canal. Operated, May 20, 1879. Moderately copious hemorrhage. Two tumors from the labyrinth wall; size, 12 by 7, and 12 by 4 *mm.* Perforation of the inferior half of the drum-membrane. After-treatment: concentrated solution of acetate of lead. Complete cure, with cicatrix, by the end of July, 1879. *Diagnosis: granulation tumor, with Malpighian and horny layers.*

CASE 67.—*Granulation tumor in the tympanic cavity.*[1]

A man, twenty-four years of age. First consultation, Aug. 16, 1881. Said he had pain in his left ear for eight days before, after a cold bath. Discharge soon followed. Perforation in the anterior superior quadrant, through which a tumor protruded. Treated with boracic acid, and afterward with concentrated solution of acetate of lead. No result. Galvano-cautery, Aug. 27th, without result. Operated, Aug. 30th, with the snare. Operated again, Sept. 6th, on account of increase in tumor. Sept. 8th, acetate of lead. Sept. 27th, return and application of galvano-cautery, also Sept. 29th and Oct. 1st. Return, Oct. 20th. Snare. Return, Oct. 25th. Galvano-cautery; again, Oct. 29th and Nov. 5th. Return, Nov. 8th; snare; return, Nov. 15th. Jan. 17, 1882, some discharge. No tumor. Last observation. *Diagnosis: granulation tumor with horny layer.*

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[1] It was not possible to determine the origin of the tumor.

CASE 68.—*Granulation tumor of the canal.*

A man, seventeen years old. Discharge for four years. Tumor at the inner end of the canal. Central perforation of the drum-membrane. Removal of tumor with the snare, July 18, 1880; size, 7.5 by 5 *mm.* After-treatment: 25 % solution of acetate of lead. Healing of perforation, Sept. 4th. Discharged cured. *Diagnosis: granulation tumor with cylindrical layer; also a few goblet-shaped cells.*

CASE 69—*Granulatiou tumor of the labyrinth wall.*

A man, twenty-six years old. Discharge which had become acute, since Dec., 1878. Tumor of the labyrinth operated, April 29, 1879. Patient left off treatment. Size, 8 by 4 *mm.* Granulation tumor, with Malpighian layer; the cells were sometimes fatty, forming large circles, which were confluent in the mass of the tumor. *Diagnosis: granulation tumor.*

CASE 70.—*Granulation tumor of the labyrinth wall.*

A boy, fourteen years old. Discharge from his right ear for two years. Many polyps springing from the labyrinth wall. Central perforation of the drum-membrane. Operated, Sept. 13 and 25, 1879. Treated until Oct. 25, 1879, with galvano-cautery and boracic acid. Healing, with perforation. Size of the tumors, 6 by 5 *mm.*, and 6 by 4 *mm.* Both granulation tumors, with horny layer. Blood extravasations in both.

CASE 71.—*Granulation tumor of the labyrinth wall.*

A boy, fourteen years old. Left-sided discharge for three or four years, after cold baths. A lobulated tumor extended to about the middle of the canal. Central perforation. Origin: promontory. Operated, June 26, 1879. After-treatment: 10 % solution of acetate of lead. Healed, with cicatrix in drum-membrane. Attachment of handle to promontory. Size, 7 by 4 *mm.* Granulation tumor with cylindrical epithelium. Several blood extravasations.

CASE 72.—*Granulation tumor of the labyrinth wall.*

A young man, eighteen and a half years old. Double-sided discharge for many years. Large defects in both drum-membranes. Right : cholesteatomatous formation. Left : polyp with broad basis. Operated, Aug. 26, 1880. Profuse hemorrhage. Size, 6 by 6 *mm.* Granulation tumor with horny layer. After-treatment until Nov. 16, 1880. Healing with perforation.

CASE 73.—*Granulaiton tumor of labyrinth wall.*

A boy, ten years old. Discharge for two years. Large defect in left drum-membrane. Operated, July 22, 1879. Size, 6 by 4 *mm.* Granulation tumor with narrow horny layer. Cured in March, 1880, with perforation.

CASE 74.—(Compare figs. 6 and 6*a*) *Fibroma of the external canal, with necrosis of the central particles of the tumor.*

A boy, twelve years old. Discharge from his left ear for four years. Two large tumors at the inner end of the canal. Operated, March 19th and 22d. Copious hemorrhage. Tumors 24 by 10 *mm.*, and 20 by 11 *mm.* After-treatment : 25 % solution of acetate of lead. Complete cure by the beginning of April of same year.

Both tumors were unusually vascular. The inner sheath of many arteries was wrinkled. The smaller vessels were mostly filled with blood or stopped up by proliferated endothelium, causing many extravasations. The stroma of the tumors was principally fibrous ; their surfaces showing all kinds of epithelium. In the middle of the smaller there was a round spot of about 1 *mm.* diameter, which gave the following condition under the microscope :

The whole field was transparent and was surrounded by a zone of connective tissue, which was lined by cylindrical epithelium in places. With higher powers this substance proved to be a homogeneous hyaline mass, made up of large and small fat-globules, giant-cells, and also of parts which made the impression of amyloid bodies ; the latter showed all kinds of shapes and forms. The periphery of this locality had a homogeneous fatty appearance, while the interior showed small or large patches of fat-granules, which were found but seldom in the other parts. *Diagnosis : fibroma of the external canal, with necrosis of the central particles of the tumor.*

CASE 75.—*Granulation tumor of the labyrinth wall.*

A girl, eight years old. Discharge from the left ear for five years, after scarlet fever. Operated, Sept. 13, 1879. After-treatment : partly liq. ferri perchlor. and partly boracic acid. Origin of tumor : the posterior half of the labyrinth wall. Posterior half of drum-membrane wanting. Alternate increase and diminution of the secretion until the spring of 1882. Size, 5 by 4 *mm.* *Diagnosis : granulation tumor ; communicating Malpighian cones ; horny layer.*

CASE 76.—*Granulation tumor of the labyrinth wall.*

A boy, six years old. Diphtheria one year before, and double-sided discharge after, which had been for a short time mixed with blood on the left side. Operated, Nov. 11, 1879. Origin of tumor : the posterior part of the left labyrinth wall. Drum-membrane largely destroyed. Size, 5 by 4 *mm.* *Diagnosis : granulation tumor with a narrow Malpighian and horny layer.*

CASE 77.—*Myxoma of the labyrinth wall, with necrosis of central portions of the tumor.*

A girl, nineteen years old. Discharge from right ear for two years. A lobulated tumor springing from the labyrinth wall. Operated, Dec. 11, 1880. After-treatment : galvano-cautery, and at the end of the month acetate of lead. Last visit, Dec. 28, 1880. Size of tumor, 11 by 6 *mm.* Through growing together of the lobes, there were cavities produced as in case 74 and others. These showed again lobular forms, covered by cylindrical epithelium. As in case 74 there were necrosed parts of the same character, only that they contained tufts of margarin crystals. The stroma of the tumor was myxomatous, very rich in blood-vessels, with many extravasations. Cylindrical epithelium. *Diagnosis : myxoma of the labyrinth wall with necrosis of central portions of the tumor.*

CASE 78.—*Granulation tumor of the region of the stapes.*

A girl, twelve years old. Discharge from her right ear since two years old, after scarlet fever. After the operation a perforation in the drum-membrane was found, through which the polyp had protruded, covering up the rest of the drum-membrane. Operated, April 27, 1880. After-treatment with a 20 % solution of acetate of lead. Complete cure in two months. Cicatrix. Size of tumor, 8 by 6 *mm.* Rich in blood-vessels, which were filled with blood corpuscles, but more frequently stopped up by proliferated endothelium. Walls thick in places. Blood extravasation undergoing alterations; sometimes in the shape of yellow spheres, but most of the cells containing blood corpuscles. Narrow horny layer. *Diagnosis: granulation tumor.*

CASE 79.—*Granulation tumor from the stapes region.*

A girl, fifteen years old. Scarlatina in Nov., 1879. Since that time, discharge from her left ear mixed with blood, especially for a short time before consultation. A tumor protruded through a perforation in the drum-membrane in its posterior superior quadrant. Operated on April 17, 1879. Size of tumor, 7 by 5 *mm.* Healing with perforation. The tumor showed the same structure as case 78. *Diagnosis: granulation tumor.*

CASE 80.—*Granulation tumor of the external canal.*

A man, twenty-two years old. Had diphtheria when four years old. Tracheotomy. Aural discharge. Later, a spontaneous perforation of a mastoid abscess. When fifteen years old, return of pain in the left mastoid process. Incision. When seventeen, pain on left side, vertigo, and brain symptoms. Return of pain on left side three weeks before consultation. Condition, July 22, 1879, as follows: cicatrix on the left mastoid. Left external canal very narrow; beyond the contracted place was a large granulation tumor, beneath which a probe could be passed into the mastoid cavity on account of caries of bone of the canal wall. All tuning-forks heard on right side, where there was only a small part of the drum-membrane remaining near the handle. Granulation removed. Size, 7 by 5 *mm.* Galvano-cautery until Aug. 2d. Further treatment at his home to Oct. 10th with salicylic acid, borate of soda, $\overline{aa}$ 8 to 200 of water. Oct. 18th, both low tuning-forks heard only on the left by bone-conduction, a^1 only on the right. Voice, left=0 right=1.0 *m.* There was a tough, pale-red membrane which was sensitive to the touch, stretching across the canal at about the end of the inner third. It had the shape of an anchor (the broad part upward), and lay in an oblique direction from above and behind, to below and in front. There were two holes in it. Through one of them the region of the posterior inferior quadrant could be inspected. Caries cured. *Diagnosis: granulation tumor with caries of the external canal.*

CASE 81.—*Granulation tumor of the drum-cavity.*

A man, twenty years old. Discharge from both ears for seven years. Examined, May 14, 1876. Double-sided otitis med. pur. with perforation and multiple polyps in both tympanic cavities. After removal of the tumors from the right ear, patient left treatment. *Diagnosis: granulation tumor with horny layer.*

CASE 82.—*Granulation tumor of the labyrinth wall.*

A boy, thirteen years old. Otitis med. pur. for three years, with perforation. Polyp from the labyrinth wall. Operated, May 14, 1880. Size of tumor, 6 by 4 *mm.* After-treatment: acetate of lead, for six months, without return. *Diagnosis: granulation tumor, with numerous deep depressions of the cylindrical epithelium.*

CASE 83.—*Granulation tumor of the labyrinth wall.*

A man, thirty years old. Ear trouble since he was eight years of age. Operated, July 5, 1879. The tumor came from the labyrinth, and protruded through a hole in the posterior inferior quadrant. Removed with the snare. Size, 5 by 3 *mm. Diagnosis: granulation tumor with horny layer.*

CASE 84.—*Granulation tumor of the labyrinth wall.*

A girl, twenty years old. Discharge from her left ear ever since childhood. Drum-membrane destroyed up to the handle. Tumor originated in the labyrinth wall. Operated, June 7, 1878. Size, 7 by 5 *mm.* After-treatment: galvano-cautery. No return. *Diagnosis: granulation tumor with horny layer.*

CASE 85.—*Numerous granulation tumors on the wall of the labyrinth, with central formation of cholesteatomata.*

Boy, age eleven. Has had pain in the ear for eighteen months without discharge. For a fortnight has had pain and discharge from the right ear. Condition: hypertrophy of the tonsils; the whole of the right *Mt* destroyed, except the handle of the hammer; multiple polypi in the labyrinthine wall. Operation, under chloroform, Feb. 16, 1880, when ten or twelve tumors as large as a pea or bean were removed. After-treatment, 25 % solution of lead acetate in dist. water. Total cicatrization of the defect; time of observation, two years. *Diagnosis: granulation tumors with thick horny layers.* Offshoots of the Malpighian layer penetrate into the interior of the tumor and anastomose with one another. Some patches of the same in the interior of the tumor have undergone fatty degeneration.

CASE 86.—*Granulation tumor in the auditory meatus.*

Woman, age sixty-nine. Has had discharge from the left ear for six weeks and pain for three weeks. A polypus at the inner end of the upper wall of the meatus was snared. Subsequent treatment with the galvano-cautery. Complete cure. *Diagnosis: granulation tumor with thin horny layer.*

CASE 87.—*Granulation tumor in the external auditory meatus.*

Girl, age twelve. Central proliferation of right *Mt.* Polypus on the posterior superior wall of the meatus; operation for removal, Dec. 16, 1879. Measurements, 9 × 5 *mm.* *Diagnosis: granulation tumor with thin horny layer.*

CASE 88.—*Granulation tumor of the labyrinthine (?) wall.*

Girl, age twenty-one, who as a child had been treated at our clinic for perforative inflammation of the left tympanum. Examination, November, 1881, shows: left *Mt*, central perforation, beyond which, and larger than its diameter, two polypi are visible. After using the acetate of lead solution, the operation was performed, Dec. 10, 1881 (the snare being passed through the perforation), and a polypus measuring 6 × 5 *mm.* removed. After-treatment: the acetic lead solution; perfect cure with cicatrization of the perforation, January 4, 1882. *Diagnosis: granulation tumor* with lobules, which owed their origin to the formation of deep furrows from inward proliferation of the cylinder-epithelium. Numerous hemorrhagic effusions; black deposits on the surface and in the centre of the tumor (sulphate of lead?). The most interesting point is a peculiar turbidity of the cell-protoplasm (probably due to the action of the lead solution).

CASE 89.—*Granulation tumor of the external meatus.*

Woman, aged forty. Has had an ulcer in her right ear for two months. March 16, 1880, a polypus at the inner end of the upper wall of the right meatus was removed with the snare; *Mt* normal. After-treatment with the lead solution. June 22, cure. *Diagnosis: granulation tumor with horny layer.*

CASE 90.—*Granulation tumor of the external meatus.*

Man, age thirty-two. Lost the sight of his right eye by a fall on his head in youth. He now has "a disease of the chest," and claims to have been deaf (with discharge) in his right ear for three weeks. Voice, right 0. All tuning-forks, however, are heard by bone-conduction on the affected side. There is a large tumor on the superior wall of the meatus, springing from the inner end. *Mt* intact. December 8, 1881, the polypus was snared; during the operation the patient was greatly prostrated. After-treatment with the concentrated acetic lead solution. The cure was perfect, but hearing was not restored. Polypus measured 7 × 5 *mm. Diagnosis: granulation tumor with a thin horny layer and small extravasations of blood.*

CASE 91.—*Granulation tumor of the tympanum.*

H. S.,[1] æt. five, has suffered since the autumn of 1879 with suppuration from the left ear, due to unknown causes. April 23, 1880, multiple formation of polypi in the tympanum. April 29th, several polypi of various sizes were snared off; galvano-caustic after-treatment. May 8th, symptoms of inflammation in the cells of the left mastoid process, with formation of an abscess. May 11th, rupture of the abscess into the posterior superior wall of the meatus. Despite repeated evacuation of the pus in its interior by pressure on the outer surface of the mastoid process, Wilde's incision became necessary, June 24th. Sept. 25th, the track of the fistula had to be chiselled open and enlarged on account of threatening cerebral symptoms. Oct. 7th, death from miliary tubercle.

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[1] A detailed account of this case was published in these ARCHIVES, vol. x, p. 31. Trepanation of the mastoid process; death from miliary tubercle.

The polypi, covered with a horny layer, are composed of granulation-tissue, with numerous Malpighian cones penetrating into the growth and there anastomosing.

CASE 92.—*Granulation tumor of the meatus, with central formation of cholesteatoma.*

Man, age thirty-two. Jan. 23, 1879, has had otorrhœa on the left side since childhood; multiple formation of polypi in the meatus and tympanum (the latter were removed with the galvano-cautery). A large polypus in the inner third of the meatus was removed with the snare (on the same day), and the complicated case, even to total cicatrization of the largely-perforated *Mt*, successfully cured March 18, 1879.

The polypus (15 × 8 *mm.*), with exception of a few myxomatous patches, consists entirely of granulation-tissue, Malpighian layer, with horny envelope; but mostly cylindrical epithelium which has proliferated in the interior, so that the tumor begins to appear lobulated. Indeed some portions of it have already undergone constriction, and seem quite ready to drop off spontaneously. *Diagnosis: granulation tumor of the external auditory meatus.*

CASE 93.—*Fibroma of the labyrinth wall.*

F. W., age twenty-three, has had a discharge from his left ear since the age of five, when he had scarlatina. At the age of thirteen, aural polypus was recognized by a physician. June 22, 1880, multiple polypus, with subsequent enlargement of the auditory meatus. June 23d, part of the polypus snared off, the largest lobe springing from the labyrinth wall being extracted with polypus forceps. It measured 24 *mm.* in length, 12 *mm.* in breadth, 7 *mm.* in thickness, and resembled a raspberry, with its lobes and irregular surface covered with small round cysts. The probe detected rough bone on the labyrinth wall. After-treatment with galvano-cautery, and later with the solution of lead acetate. Aug. 1st, violent pain in the head, paralysis of the left facial nerve. Aug. 21st, death from abscess of the cerebellum.[1] *Diagnosis: fibroma.*

The remaining seven cases were amongst those that we observed and treated. But we are unfortunately unable to give their history, owing to the fact that the specimen labels were lost during two changes in the locality of the clinic.

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[1] For details of the case, see these ARCHIVES, vol. x, p. 121.

CASE 94.—*Granulation tumor.*

Granulation tumor, 8 × 5 *mm.*, with cylinder-epithelium.

CASE 95.—*Angio-fibroma.*

Polypus, 8 × 7 *mm.* Horny layer ; part of the Malpighian layer has undergone fatty degeneration.

CASE 96.—*Angio-fibroma with cylinder-epithelium.*

CASE 97.—*Angio-fibroma.*

Tumor, 10 × 9 *mm.*, with very large vessels. Malpighian layer with a narrow horny layer. The cement lines of the penetrating cells of the Malpighian layer form a coarse net-work in which we still see a few nuclei of the original layer.

CASE 98.—*Granulation tumor.*

Tumor, 19 × 7 *mm.*, with a horny layer. Near the surface an extravasation of blood, which has elevated the horny layer. It was probably due to the use of the probe before the operation.

CASE 99.—*Angio-fibroma.*

Tumor, 8 × 6 *mm.* The Malpighian cones penetrate deeply and anastomose with those of the same side, and partly with those of the other. The latter are very sharp. Corneal layer (compare fig. 3).

CASE 100.—*Angio-fibroma.*

Tumor, 10 × 9 *mm.* Fibromatous structure. Endothelial and perithelial proliferation of vessels. Proliferations of the Malpighian layer penetrate into the whole tumor from every side, give rise to furrows, and secondarily to the snaring off of various lobes. (compare fig. 2).

Explanation of the Figures.

Fig. 1 *; Fig.* 1, *a ; and Fig.* 1, *b.*

A portion of the section of the polypus in case No. 20. Hartnack $\frac{3}{2}$. Tube 0. Myxomatous stroma, surrounded at the right by a Malpighian layer. Beneath it several vessels which are very poorly represented in the stroma itself. One circular and one irregular hole are visible even to the naked eye in the centre of the polypus. The interior of the circular hole is composed of overlying horny plates ; the dark peripheral zone, of stratified Malpighian cells (fig. 1, *a*, Hartnack $\frac{2}{7}$). The horny plates have escaped from the interior of the irregular hole. The peripheral zone, which has produced a certain number of offshoots, shows the same cell-formation as that of the circular hole (compare fig. 1, *b*, Hartnack $\frac{2}{7}$).

Figure 2.

Section of the polypus in case No. 100. Hartnack $\frac{2}{7}$. Tube 0. The figure shows almost the entire surface of the tumor. We see the sections of several septa which pass from various sides into the interior of the tumor and partially communicate with one another. In this way, the stroma of the tumor has undergone numerous reduplications, while at the periphery some portions have been strangled away and have fallen off. The structure of the tumor is described in the notes of the case.

Figure 3.

The halves of a section through the polypus in case No. 99 Hartnack $\frac{2}{2}$. Tube 0. The stroma of the tumor is angio-fibromatous. The surface is a Malpighian layer with a horny envelope. Cones pass from the former into the interior of the polypus, and anastomose partly with those from the same side and partly with those from the opposite side. In this way, some portions of the tumor have become isolated, as is particularly visible at the lower margin of the figure.

Figure 4.

About three fourths of a section through one of the multiple tumors in case No. 91. Hartnack $\frac{2}{2}$. Tube 0. The polypus is composed of granulation-tissue alone, and broad, extensively anastomosing Malpighian cones, which appear dark in the drawing, while the stroma of the tumor is bright.

Figure 5.

Central portion of a section through one of the tumors in case No. 13. Hartnack $\frac{2}{2}$. Tube 0. The tumor has numerous recesses and fissures, which like the surface are lined with cylinder-epithelium. The fissures originate from secondary union of the adjacent surfaces of the indentations (as at *b*). We also find that some parts of the tumor have been strangulated within the fissures by the enormous inward proliferation of the epithelial envelope (as at *a*). This process as well as the secondary disturbances of nutrition have led to necrosis in the interior of the tumor, even without the access of air. The bright portions in the drawing correspond to the granulation-tissue ; the dark portions are angiofibromatous in structure.

Figure 6 *and Figure* 6, *a.*

Part of a section from one of the larger polypi in case No. 74. Hartnack $\frac{2}{2}$. Tube o. We see several cavities of various sizes which have originated in the manner described under fig. 5. Some of these are empty ; the two larger contain a substance the microscopic condition of which is shown in fig. 6, *a*. Hartnack $\frac{3}{8}$. Tube o. This exhibits fat globules of various size, while interspersed are seen extraordinary structures, resembling amœboid cells, molar teeth, stars, cactus plants, or multipolar ganglionic cells. The offshoots of these structures give off a homogeneous, brilliant, fatty lustre, while in the interior of the structures themselves we find numerous clumps of fatty granules, which in the offshoots themselves are but occasionally to be seen.

Figure 7.

A portion of a section from the centre of the tumor in case No. 37. Hartnack $\frac{3}{7}$. Tube o. The centre of the drawing shows the mosaic arrangement of the cement lines of the non-nucleated cells, which in turn have originated from regressive metamorphosis of the Malpighian cones, which had once penetrated the interior of the tumor ; *in other words, a central cholesteatoma.* Some of the more peripheral cells contain a nucleus. At the right and left of the locality just described, we see the well-preserved cells of the Malpighian cones ; at the left, some of the same cells surrounded by an enveloping membrane, and counterfeiting a giant-cell.

Figure 8.

A portion of the centre of the tumor in case No. 46. Hartnack $\frac{2}{7}$. Tube o. Typical granulation tumor. The stroma consists of fibrillar tissue, mostly of round, but partly of oval and spindle-shaped, cells. We also see a large number of blood-vessels which have been divided obliquly, in the centre of the picture one divided longitudinally. Almost all of the vessels are filled with blood corpuscles or endothelial cells. The walls of some of the vessels have begun to undergo proliferation. (The delicate fibrillar structure can of course be demonstrated only by higher magnifying powers.)

Figure 9.

Part of a transverse section of the tumor in case No. 16. Hartnack $\frac{2}{7}$. Tube 0. Three vessels have been divided, mostly filled with blood corpuscles, the outer walls partly infiltrated with cells, and occasionally thickened by proliferation of the parietal elements. Several fibres, broader or narrower, as the case may be, pass from the outer walls in different directions, anastomose with one another, and form a net-work amidst which a few round and oval cells lie scattered (angio-fibroma).

Figure 10.

A peripheral portion of a transverse section of the tumor in case No. 28. Hartnack $\frac{3}{4}$. Tube 0. Concentric lamellæ of horny epidermis in the centre of the figure. At their periphery they are sharply separated by a bright space, from a circular layer of Malpighian cells. The whole appearance greatly resembles the "pearl nodule" seen in cancroids. At the right and left we see the faint clubs and cones of the Malpighian cells extending inward from the surface. The remainder of the growth consists of granulation-tissue. The surface bears a thin horny layer.

Figure 11.

Section through the *whole tumor* in case No. 17. Hartnack $\frac{2}{4}$. Tube 0. The structure is identical with that of case No. 9 (angio-fibroma). The surface consists of a comparatively thin Malpighian layer, which in the middle of the edge of the section sends more or less deep offshoots into the interior of the tumor. The black contour on the surface represents the narrow strip of cornified cells (epidermoidal transformation of the mucous membrane of the labyrinth wall). The anastomosing cords of the Malpighian layer have already prepared for the imminent strangulation of a small portion of the tumor.

GENERAL REVIEW.

The sex of the patients was as follows: 66 males; 27 females; 7 not noted.

The age of the patients may be tabulated thus:

Between	1	and	10	years	12 cases.
"	10	"	20	"	36 "
"	20	"	30	"	23 "
"	30	"	40	"	9 "
"	40	"	50	"	9 "
"	50	"	60	"	1 "
"	60	"	70	"	3 "
Unknown					7 "

Only sixteen cases of suppurative inflammation leading to the formation of aural polypi could be precisely ascribed to infectious diseases, viz.: ten to scarlatina; two to diphtheria; and one each to typhoid, measles, variola, and syphilis. We are of the opinion that there ought to have been more cases than these (with infectious diseases as the cause), but we must remember that many years may elapse between the origin of the affection and the consultation with the aurist, so that the patients have forgotten the original cause. And again, they often come to us, unaccompanied with parents or relatives who could give us more exact information upon the especially interesting question of the etiology of the disease now under discussion. Nevertheless, it is worth noticing that, in agreement with facts noted by other observers, we found scarlatina to be the most frequent cause.

The polypi were *single* in eighty-one cases, *multiple* in nineteen. The multiple polypi occurred occasionally in the meatus alone, occasionally in the tympanum alone, six times in both simultaneously. *Otorrhœa was absent in only a single case* (case No. 11).

The tumor was located twenty-five times in the meatus, once (case 11) close to the orifice of the meatus. In all the other cases it was deep-seated, usually close to the *Mt*; in the tympanum sixty-eight times; once on the roof, otherwise on the wall of the labyrinth; eight times near the stapes.

Not a single polypus in our series of cases sprang from the *Mt* itself, nor even from the handle of the hammer. These localities are occasionally, though rarely, affected.

Amongst the ninety-three cases in which the condition of the *Mt* was noted, in only nine could it be considered absolutely *intact*; in other words, it was perforated or destroyed in eighty per cent. of all our cases of polypus. This is a fact which shows that the prime cause of the formation of polypi is to be sought for in suppurative inflammation of the tympanum ; it also explains the extremely frequent origin of the tumor from the mucous membrane of the drum, especially from the labyrinthine wall. It is one of the greatest of rarities to discover a polypus which did not owe its origin to a previous suppurative inflammation.

The number of cases in which a *relapse* was undeniable was eighteen. The shortest interval between the operation and the relapse was one month ; the longest, nine years.

Twenty-nine cases were *perfectly cured ;* many of the patients were satisfied with the simple removal of the polypus, and did not return for after-treatment at all, while some of them left our care even when we knew that suppuration was still present.

Five polypi came away after simply syringing the meatus. A relapse was noticed in three of these cases. One of the five had been previously treated with the concentrated lead solution (case 36). In another, fatty degeneration of the tissues in the pedicle was observed (case 54). In the other three cases, excessive hemorrhage followed the removal of the tumor.

Ten polypi were accompanied with caries: six of the mastoid process alone ; one of the meatus and the middle ear simultaneously ; one of the labyrinthine wall ; one of the pyramid ; and one of the meatus, the mastoid process, and the pyramid together.

Four of the cases (27, 32, 49, 59), were *accompanied with cerebral symptoms before the operation.* The immediate cause in all of these cases was the hindrance to the outflow of pus by the tumor, for when the latter was removed and a free exit established for the pus, the cerebral symptoms disappeared without any other treatment. The symptoms referred to consisted chiefly of genuine epileptic attacks, headache, vertigo, vomiting, supra-orbital neuralgia, and clonic spasms, etc., in the region of the extremities of the affected side.

The accidents that ensued *after the operation* (removal of the growth with Wilde's snare) must be partly ascribed to the operation itself. Amongst these we had: in case 90, fainting; in case 6, paralysis of the sense of taste (probable injury of the chorda tympani while snaring the tumor); in case 56, erysipelas[1] started from the operated ear, and was accompanied with meningitis and nephritis. The complications subsequent to the operation are partly referable to the accumulation of pus (facial paralysis in case 15), and partly to the long duration of the suppurative inflammation which accompanied or gave rise to the polypus. In two cases, with or without caries, there was meningitis alone, cerebral abscess alone, and finally both together (cases 37, 56, 93). The tubercular meningitis which was observed in case 91 must be regarded as entirely accidental, and quite independent of the other symptoms in the case.

CLASSIFICATION OF THE POLYPI ACCORDING TO THEIR STRUCTURE.

Aural polypi have hitherto been classified as round-celled, fibromatous, myxomatous, angiomatous, and mucous or muco-glandular. But our series of cases seems to show that the name mucous polypi must be abandoned (at least so far as concerns *aural* polypi), for to say nothing of the entire absence of glands in the mucous membrane of the tympanum, the tissues in these polypi, which former authors regarded as tubular glands, are simply cavities formed by the inward proliferation of the epithelium (formation of fissures and indentations), and at a later stage, partial covering in of the tissues of the tumor themselves.

The name "angioma," although no polypus of such a structure was discovered in any of our present list of cases,[2] must still find a place in the nomenclature of these tumors, although of rare occurrence. Buck[3] was the first to show that angioma may spring even from the handle of the hammer itself, and that the vessels of the hammer by taking a pre-eminent share in the development of the tumor give to the neoplasm its distinctive anatomical character. Moos[1] has since observed two similar cases.

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[1] The operation in this case was very easily and rapidly performed, but erysipelas was then epidemic in the town, and particularly in the hospital.

[2] Yet we saw four cases of exquisite cavernous structure in the pedicles of tumors.

[3] These ARCHIVES, vol. 2, part 1, page 72.

It is important in a clinical point of view to notice that all of these tumors may be followed by excessive hemorrhage during the operation, or by secondary hemorrhage, which demands so heroic a procedure as tamponage of the meatus. In this respect, however, the benignant angiomata do not essentially differ from certain malignant forms which are occasionally observed in the human meatus.[2] We adopt the rest of the customary nomenclature, except that we call the common "round-cell polypus" "*granulation tumor,*" and subdivide the fibromata into pure, and so-called angio-fibroma.

Our list may be classified as follows :

Granulation tumors	55
Angio-fibromata	27
Fibromata	14
Myxomata	4
	100

Granulation tumors.

The account of the cases and the accompanying figure (8) satisfactorily show why we prefer the name "granulation tumor" to the hitherto accepted designation "round-cell polypus." All of these neoplasms exhibit the exquisite structure of the so-called granulation tumors, characterized in the first place by a delicate fibrillar fundamental tissue; secondly, by a number of cells which are mostly round, partly oval or spindle-shaped; and finally by numerous blood-vessels, which are sometimes filled with blood and sometimes with endothelial cells. These granulation tumors represent at the same time the transition step in the development of

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[1] These ARCHIVES, vol. 3, page 107, and *Virchow's Archiv*, Band lxviii, case 6.

[2] Politzer : Lehrbuch der Ohrenhlkde., Band ii.

Angio-fibromata.

When granulation tumors have lasted for some length of time, the elements of the vascular walls particularly begin to undergo proliferation (compare, *e. g.*, case 45), the preliminary stage of which can frequently be discovered on examining aural polypi. If the operation is not now undertaken, the angio-fibromata develop according to the following type: The cells of the adventitious sheaths (perithelial tubes) of many of the vessels begin to proliferate, and thus to produce an anastomosing series of cellular strands which form a narrower or wider net-work, as the case may be. At the same time, the endothelium proliferates and the vascular walls increase in thickness. If this process advances still further along the vessels, they may in time become entirely obliterated, so that at a later stage the tumor is very poor in blood-vessels. The anastomosing cellular strands simultaneously thicken, their cellular elements becoming transformed into spindle-shaped cells, and later into connective-tissue fibres. The result of this process is that we get a picture of a tumor with coarse fibres, very poor in cells and blood; one whose development from vessels can only be demonstrated by the presence of a few of the latter clogged with blood or undergoing obliteration (compare fig. 11, from case 17). The view above expressed seems to be supported by the fact that in the case of a relapse after the operation upon granulation tumors the new polypus is frequently of angio-fibromatous structure (compare, *e. g.*, case 44).

If we compare the condition of things in our case with the description of angio-sarcomatous growths (cylindroma, cylinder tumors, cylindrico-cartilaginous tumors, etc.) as given by other authors,[1] we cannot deny that both varieties of tumor greatly resemble one another as well in development as in structure. In the classical angio-sarcoma we also have a neoplastic formation of cellular strands from the walls of the vessels, and subsequent metamorphosis.

Clinically, however, these two forms of tumor are differentiated by the fact that angio-fibromata of the ear never infect the neighborhood of their native soil, and consequently never appear as secondary affections, which, as is well known, is occasionally the case with angio-fibromata of other regions. For these reasons we have chosen the name angio-fibroma instead of that of angio-sarcoma, *but that title should be strictly reserved for such tumors as are developed from blood-vessels.* A tumor with cavernous spaces should not be called an angio-fibroma.

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[1] Compare the careful anatomical paper with bibliography by Kolaczeck, " Ueber das Angiosarcom," *Deutsche Zeitsch. f. Chirurgie*, Band ix (1878), page 1, continued on page 165.

It sometimes happens (case 18) that a cyst becomes developed from the blood-vessels of the tumor.

Fibromata.

Clinically and macroscopically, the fibromata are not to be differentiated in any way from the so-called angio-fibromata, but *genetically* there is a decided difference, for while the blood-vessels take a *direct* share in the development of the angio-fibromata, they are only indirectly connected with the development of the fibromata. Fibromata are developed especially from the formative cells which have wandered from the blood-vessels. We frequently see these cells lying in heaps closely adherent to the walls of the vessels or very near them, and it is from these that the spindle-shaped cells are developed, and 'from these in turn the connective-tissue fibres which predominate in the stroma of the tumor and give it its peculiar appearance. Whenever the spindle-shaped cells do not undergo further metamorphosis, so-called myxomatous portions remain and are frequently discovered in the tumor as " disseminate myxomatous patches."

Myxomata.

Our cases of myxomata were as rare as those discovered by Steudener, only four in one hundred. A pure myxoma in aural polypus is very rare. Three of our cases originated in the tympanum, the fourth in the external meatus. It is quite probable, so far as concerns pure myxoma originating in the tympanum, that the irritation appertaining to suppurative inflammation of the tympanum led to the development of this peculiar tumor from some remnants of those mucous tissues that had outlasted fœtal life.[1]

The epithelium of the polypi.

Sixty-eight of our series of one hundred polypi had a Malpighian investing membrane with its horny layer; eighteen, a cylinder-epithelium; three, a cylinder- and ciliated epithelium alike; while eleven exhibited all of the well-known varieties of epithelium, variously arranged. The latter cases have convinced us of the important influence exercised by the mechanical relations (pressure of the various portions of the tumor upon one another and dislocation particularly in the case of large tumors) upon the occurrence of various forms of epithelium. The Malpighian layer, for instance, offers extensive variations in thickness, whilst the shape of the surfaces of the tumor which it covers differs extraordinarily in nearly every tumor. Thus the surface terminates occasionally in elevations and depressions like waves, and then again in sharp-pointed papillæ, the summits of which are wreathed with vessels. At another spot, the surface is entirely smooth, and the Malpighian layer stretches evenly across it, occasionally sending into the interior of the tumor more or less sharp or blunt offshoots which here and there anastomose with those of the same side or also with similar ones from the other (case 91, fig. 4; case 17, fig. 11). The more tumors we examine the more vivid becomes the impression that these offshoots are the original cause of the subsequent formation of lobes and folds in the tumor,[2] as well as the separation of entire portions of the polypus, for when the centre of the cones which are made of Malpighian cells undergo cornification and the cornified layer drops off, the tumor splits.

This view is further confirmed by the formation of

Central cholesteatomata.

which we found in ten cases in the centre of the tumor, besides clumps of cholesteatomatous plates which in other portions of the tumor formed round or circumscribed islets, depending upon whether the offshoots from the Malpighian layer had been divided obliquely or parallel to the long axis. These pictures vary greatly, depending upon the number and form of the cones that have been divided by the section, but still more upon the fact that the epidermoidal cells of which the cones are composed are discovered in various stages of transformation and cornification. It therefore happens that in the centre of a section we see the non-nucleated cells with their cement lines arranged in mosaics (fig. 7, case 37), or again round, irregular fissures[1] (which are due to the loss of cornified portions) surrounded by a wreath of well-preserved Malpighian cells (compare fig. 1, *a*, and 1, *b*, case 20). In other sections, the cells which lie within the sections of the cones are still unaltered, the latter being then easily recognized as deeper tinted islets, resembling giant-cells within the tissues of the tumor (compare case 37, fig. 7, to the left in the drawing).

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[1] Compare Cohnheim's views on the etiology of neoplasms. Allgemeine Pathologie, 2te Theil.

[2] These ARCHIVES, vol. viii, p. 280.

When several adjacent cones have been divided obliquely or longitudinally by the section, we have of course the greatest variety of pictures, particularly in tinted preparations, depending on the stage of the transformation: whitish-yellow, colorless clumps and long lines of cornified cells surround the sections of cones which are still intact or just about to undergo transformation (fig. 7). In the centre of these clumps we still can discern a considerable number of cholesterine plates, despite the preliminary hardenings by alcohol. We moreover find extravasations of blood, blood corpuscles, organized cells, pigment, while the cholesteatomatous clusters are occasionally permeated with hæmatoxylin. On this point we shall speak more particularly in discussing the presence of hemorrhagic extravasations in the polypi.

The epidermoidal transformation of the tympanic mucous membrane

is worth noticing in a practical point of view, in so far as it gives rise to unusually frequent relapses of polypi in this locality (compare case 17).

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[1] In many cases even with the naked eye.

When this alteration of the tympanic mucous membrane takes place, it results in a neoplastic formation of papillæ like those of the cutis, except that the intervals between them as well as their surfaces are covered with Malpighian cells and a horny layer. In just the same way as papillæ of the cutis, under certain circumstances, are transformed into warts, so polypoid growths originate from corresponding alterations in the mucous membrane of the tympanum. It is these growths which, despite their minute size, offer an obstinate resistance to radical removal, and all the more since they are preceded by a small-celled infiltration of the epidermoid layer, from which a chronic inflammatory condition is set up and persists indefinitely.

SPECIAL HISTOLOGICAL CONDITIONS IN THE POLYPI.

I.—*Hemorrhagic extravasations and pigment metamorphosis*

are frequently observed in aural polypi; they are sometimes circumscribed, and sometimes diffuse. The more immediate causes of their origin are:

1. Increased vascularity.
2. Obstruction of the vessels by endothelial proliferation in cases of tumors of rapid growth.
3. Thinness of the vascular walls (giant capillaries).
4. Regressive metamorphosis of the stroma and secondary alterations in the tension of the interior of the tumor (especially in the case of central formation of cholesteatomata).
5. Mechanical influences before the operation (such as probing the polypus), or even the operation itself (snaring).

Pigment in every variety was observed, hæmin-crystals included (compare the various cases).

II.—*Neoplastic formation of bone in the polypi*

was observed in three cases (16, 37, 56). The encapsuled pieces of bone were sometimes single, sometimes multiple; in case 56, they were seen at both the centre and periphery of the tumor. This neoplasm must be regarded as *hetero-*

plasia. The histological details can be found in the notes of the various cases.

III.—*Central necrosis*

was observed in two cases (13 and 74; compare also fig. 6, and fig. 6, *a*).

Origin of the necrosis.

When the raspberrylike lobed polypi increase in size, the tips of the larger lobes occasionally grow together, and the tumor develops itself further and further outward from this place of union. But in the interior of the growth has thus originated a cavity which now includes the smaller lobes which were formerly on the exterior of the polypus. Hence not only the inner surface of the cavity but also the surface of these interior lobes, as it were, are covered with the same epithelium as the outer surface of the polypus. The epithelium now by proliferating inward strangulates various portions of the tumor in the *interior* of the polypus in a manner similar to that which we repeatedly described as taking place on the *exterior* of the polypus, so that the interior lobes just mentioned are separated from their native soil and entirely deprived of nourishment. But while this process going on at the *exterior* surface of the polypus leaves no traces behind, and the particles of the tumor thus separated are usually washed away unnoticed in the secretions of the meatus, the internal lobes of the polypi, as we may thus style them, undergo necrosis without the entrance of air, and produce in all probability those peculiar microscopic pictures which we have described in case 74, and depicted in fig 6, *a*. The strangulated portion deprived of its nourishment, probably swells, fills the cavity completely, and its elements yield sooner or later to retrogressive metamorphosis, the fatty or waxy products of which in our specimens still permit us to recognize the various transformation stages, such as swelling, formation of fatty granules, and confluence of the granules into little conical bodies. The connective tissue formerly contained in the lobes which have undergone necrosis has probably furnished the tenacious, hyaline substance in which the fatty bodies as well as the remnants of cells are embedded.

IV.—*Formation of cysts*

was only observed in one case, and in that from the blood-vessels (case 18).

TREATMENT OF AURAL POLYPI.

A majority of our observations belong to a time when the surgical and medical treatment of aural polypi was still immature. Many of our remarks scattered at random amongst the notes of the cases are at this date widely open to criticism. We will refer, for instance, to the cauterization with the silver-nitrate pencil, of polypi or of their roots after removal of the body of the polypus with the snare, a procedure which for evident reasons has now been generally abandoned. Beyond this, however, we will venture to speak a few words concerning our experience with other methods of treatment.

The operative removal of aural polypi must be undertaken without hesitation.

1. As a matter of life and death, when the symptoms indicate an accumulation of pus. Various cases (27, 32, 49, 59), moreover, show that the operation may be entirely successful even when cerebral symptoms are undeniably present.

2. In all cases in which a single polypus or several of them together have attained so large a size that they are liable to fill the cavities in which they lie, and to give rise to an accumulation of pus with all its accompanying dangers.

In such cases as these we can never be sure how long or how short a period may ensue before fatal consequences appear. In case 15, *e. g.*: facial paralysis appeared in ten days *after* the operative removal of the polypus. If we had lost a few weeks' time in this case in remedial treatment, it is probable that this complication would not have continued *the only one*, or that it would not have disappeared at all, as it really did, as the history of the case shows.

Polypi that are not quite large enough to hinder a satisfactory exit of pus, may experimentally be treated with remedies: amongst which we place in the front rank absolute alcohol,[1] which was first recommended by Politzer, and subsequently employed with great satisfaction by ourselves and others; or with acetate of lead in the strength and with the modifications which we from time to time have suggested.

Method of using lead acetate.

We use this remedy in both private and dispensary practice, not only in simple chronic suppurative inflammation of the tympanum, but in similar cases complicated with polypi. Experience has, however, taught us that we cannot rely upon it in cases of caries. Since 1869, Moos has employed it most successfully in hundreds of various cases of the above-mentioned diseases; a perfect cure with cicatrization of the perforated *Mt* being almost invariably gained. It is true enough that many practitioners before our time had used solutions of lead acetate, but we were probably the first to resort to the supersaturated solution in water. For we use from ten to twenty-five per cent. of lead, with the addition of five to ten drops of acetic acid. We thus have a transparent solution (which should never be turbid). The patient's head being held toward the shoulder, the solution is dropped into the ear from a glass pipette, and the ear is then plugged with salicylic cotton (which should not be pushed too deeply into the ear) in order to keep the remedy as long as possible in contact with the affected surface. This should be done at least twice a day, after thoroughly cleansing the ear. The application of the remedy is occasionally followed by a more or less stinging or burning pain, which is, however, generally transitory and does not hinder us from prosecuting the treatment. Pain is also sometimes felt in the pharynx when the solution flows off along the Eustachian tube.

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[1] The favorable resorbent action exercised upon aural polypi by other remedies also seems to depend upon the action of the alcohol which they contain. Thus, to cite a pertinent case, Moos, as far back as 1859, effected a radical cure in the case of a tympanic polypus extending quite to the meatus, as well as simultaneous cicatrization of the perforation in the *Mt*, by simply brushing the tumor with laudanum for a period of about six weeks.

We are sometimes so fortunate as to find in the course of a very few days that the mucous membrane of the promontory, previously red and thickened, has already become less swollen and grown paler, that the discharge has decreased in amount, and that the inflammation has even disappeared with or without closure of the perforation. The duration of treatment depends greatly upon the individuality of the case, particularly upon the intensity and extent of the local morbid process, and upon any constitutional symptoms that may be present. In our series of cases may be seen some of double suppurative inflammation of the tympanum following scarlatina, which were absolutely cured after a treatment of six weeks.

We will not further dilate upon this method, but refer its value to a test at the hands of our professional brethren, leaving it still an open question whether the acetic acid and the plugging of the meatus may not simultaneously exert a certain amount of antiseptic action.

If the solution is used too freely, as may happen if we leave the treatment to the patients themselves, painful excoriations may appear in the meatus. But if these excoriations should be noticed, we must abandon the lead solution till they cicatrize. Ten or fifteen drops are not too many, particularly in case of a large defect in the *Mt.* We have never known the solution to cause anchylosis of the ossicles and defect of hearing from deposits of lead, as suspected by Politzer. On the whole, there are but two precipitates possible during the use of the acetate of lead: *a*, hydric oxide of lead, which is white and soluble; *b*, anhydrous oxide of lead, which is red, and has never yet been observed; *c*, sulphate of lead, which is black, and can easily be syringed away. White or whitish-yellow albuminates of lead may also occasionally be observed.

Manner in which the modified solution of lead acetate acts upon aural polypi.

In case No. 36, granulation tumor of the tympanum, with horny layer 9 × 6 *mm.*, and case No. 88, two granulation polypi of the wall of the labyrinth, both 6 × 5 *mm.*, we had a good opportunity of carefully studying the physiological action of this remedy, but we are obliged to confess that we have seen only one case in which it really seemed to destroy and throw off the polypus from its native soil. In brief, its action is this: it probably opacifies and shrivels the cell-elements of the tumor, constringes the blood-vessels, and causes thrombosis (which we have observed microscopically [1]), which in turn is followed by further shrivelling or necrosis, or even total exfoliation, without any hemorrhage, as in case 36. The superfluous lead can then be recognized as a finely granular black deposit (sulphate of lead) in the stroma of the polypus. It is probable that the favorable effect of this solution in chronic suppurative inflammation of the tympanum acts in the above-mentioned manner.

Our experience with the favorable action of the modified lead solution has been more extended than with that of alcohol, for we had used the former for years before the alcohol treatment was recommended. And yet in one case, No. 67, alcohol was the only remedy that was successful. Still, in other cases in which alcohol had failed to act beneficially, even after weeks of use, we obtained a cure by resorting to the modified lead solution.

If we may venture to explain our lack of success in the treatment of aural polypi with alcohol as compared with the lead solution, we would simply say that alcohol is probably more suitable for cases of granulation polypi, lead for the coarser fibromatous neoplasms. Still we must wait for further comparative experience upon this point. It is also possible that, in cases of tympanic polypi with minute perforations in the *Mt*, alcohol may act more favorably on account of its greater power of penetration (compare on this point, cases 67 and 68).

Galvano-cautery.

Although many of our most skilful aurists do not use the galvano-cautery, we must express the opinion, based upon five years of experience, that there are cases in which we can only gain a rapid cure or even any cure at all, by means of the galvano-cautery. It has been serviceable to us:

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[1] Perhaps the lead solution reaches the interior of the blood-vessels and causes direct thrombosis by coagulation.

1. As the very best method of after-treatment to prevent relapses.

2. In the rapid removal of smaller tumors that could not be reached at all, or only with difficulty, with the snare; *e. g.*, when the granulations are attached to the hammer or other bony parts in cases of perforation of the *Mt.*

3. In cauterizing cholesteatomatous masses in the tympanum, usually so difficult to remove. The common way is to resort to instillations to soften these masses and then to syringe them away. But instead of softening, they frequently begin to swell, cause pain and even inflammation. A single application of the galvano-cautery will often suffice to destroy them (compare case 65).

4. In producing a stiff cicatricial tissue as free from blood-vessels as possible, in the place of a softened and thickened lining of the tympanic cavity that has undergone epidermoidal transformation and is liable to continue in a chronic inflammatory condition. In this point of view compare the frequent relapses in case 17, which were treated without the galvano-cautery.

5. In cases of multiple formation of larger or smaller polypi whose origin in the deeper-seated portions of the ear is difficult to detect, and in which it is quite impossible to remove all the roots with the snare (case 92).

6. In caries with formation of polypi, whenever it is necessary to obtain a satisfactory exit for the pus.

A CASE OF BILATERAL DEAFNESS FROM MUMPS.

By H. KNAPP.

TOTAL deafness from mumps in one or both ears is spoken of in general terms by many authors, but it seems that only of late detailed histories of such cases have been reported. The clinical material for a comprehensive description of the affection and for a discussion of its nosology is still so scant as to encourage the publication of new observations. To the five cases which Brunner cites in his paper upon this subject on pages 102–105 of this volume, another one, published on page 232 of this volume, in my report on 806 cases of ear disease may be added, in which the deafness, without any evidence of middle-ear affection, was on the right side only. In the following case the deafness was on both sides, absolute, and likewise without affection of the middle ears.

Theresa O., æt. twenty five years, of New York City, consulted me Aug. 10, 1882, giving the following history. She had never had any ear disease, and had enjoyed perfect hearing and good health until six years previously, when in the autumn she suffered from an acute attack of mumps, with immense swelling on both sides, which lasted two weeks. On the sixth day her hearing was still good, on the seventh it was weak, on the eighth completely lost, and has remained so ever since. She complained of earache and headache, but had no discharge. On the seventh and the following days she suffered from great dizziness, which lasted for months, and, in fact, has never completely disappeared, for frequently now she feels dizzy and inclined to fall over. She does not remember the presence of tinnitus aurium ; certainly she had none during the last year.

I found the patient a healthy, intelligent, and well-developed young lady, who, during the six years of total deafness, had lost nothing of her speech. She could not hear a sound either by air- or bone-conduction. Words spoken in her ears through a hearing tube or otherwise produced an unpleasant sensation, but not that of sound. A large tuning-fork placed on the tragus, and with it stopping the ear-canal, was felt, not heard ; the same when placed on different parts of the skull. Physical examination of the ears, Eustachian tubes, and the naso-pharynx revealed perfectly normal conditions. Inflation, even by Valsalva's experiment, was easy.

To my mind the total deafness, its rapid, almost sudden occurrence, the absence of marked symptoms of middle-ear disease, the dizziness and disturbances of equilibrium long after the attack has ceased, are sufficient evidence that the lesion in these cases is labyrinthine, not tympanic. Whether its nature is a serous, hemorrhagic, or purulent inflammation can, in the absence of autopsies, not be decided. A direct continuation of the disease through the auditory canal and the tympanic cavity, or through the canal of the facial nerve, is a vague and quite improbable supposition. I have seen cases of acute epidemic parotitis—one in which the father and two of his children were affected—complicated with middle-ear disease, but the symptoms were totally different from those in the above-cited instances. First the walls of the ear canal became red and greatly swollen, so that for a time scarcely any calibre was left, then the membrana tympani was red and thickened, soon it perforated, and a free purulent discharge set in, which lasted longer than the parotitis, but finally all the aural symptoms disappeared, and the perforation in the *Mt* closed. The impairment of hearing increased gradually, and reached only a moderate degree corresponding to the intensity of the otitis media. After the recovery the hearing was perfect. Bone-conduction never was weakened, and dizziness and disturbances of equilibrium not complained of either during or after the attack of mumps. I think the total sudden deafness in mumps without middle-ear affection is of a metastatic nature, like the orchitis and other complaints which are noticed during the same disease. It does not follow that all metastatic affections of the inner ear must result in total deafness. In the eye, though metastatic irido-choroiditis is doubtless a very disastrous disease, some affections of an evidently metastatic nature run their course without destroying the organ or even seriously damaging the vision. I related such a case at the meeting of the American Ophthalmological Society in July, 1882; and what experienced oculist, when he is called to treat a case of iritis complicated with an inflammation of the knee joint, does not know at once that both affections were shortly preceded by gonnorrhœa of the urethra? The affection of those disconnected organs is evidently not the result of propagation of the *materies morbi* along an uninterrupted tissue-channel, but through the current of blood, if we leave the reflex irritation out of the question. The continued investigations on micro-organisms are likely at no very distant day to throw light on this as on many other subjects. Until that day the convenient word "gonorrhœa metastases" will not be out of order. But every oculist knows also that the gonarthritis and the iritis resulting from gonorrhœa of the urethra, get well and usually do not destroy sight. In a similar way, it is quite likely that the milder forms of metastatic affection of the inner ear in mumps disappear without destroying hearing, or without destroying it in both ears, just as in the above-mentioned case of metastatic irido-choroiditis (from metritis), the affection in one eye was mild and terminated in recovery of sight, while in the other it destroyed the eye. The cases of loss of hearing during mumps are rare, yet the affection may be more frequent than we thus far know, as it is not impossible that we have failed to diagnosticate many a mild case.

MISCELLANEOUS NOTES.

The unabridged translation of Politzer's "Text-Book on the Diseases of the Ear and Adjacent Organs," by Dr. James Patterson Cassels, of Glasgow, in one stately volume of 800 pages (London : Baillière, Tindal, & Cox ; Philadelphia : H. C. Lea's Son & Co.), is before us. The admirable treatise will be reviewed, by a German pen, in our next issue, but we cannot delay expressing our obligations to the distinguished translator for bringing out this standard work in clear and good English almost simultaneously with the original.

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Fig 1.

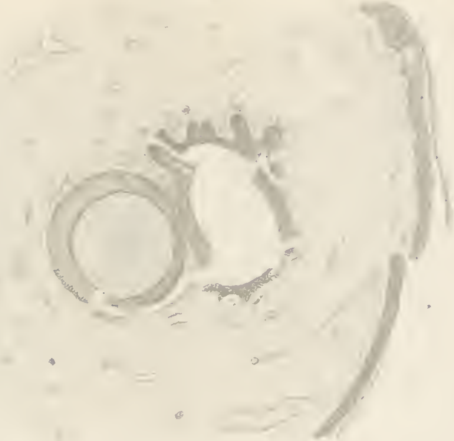


Fig 2 $^2_2$

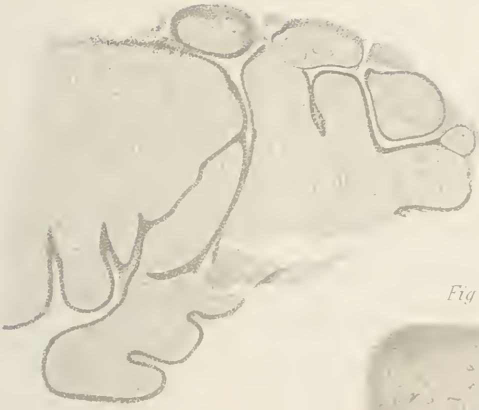


Fig 1a $^2_7$

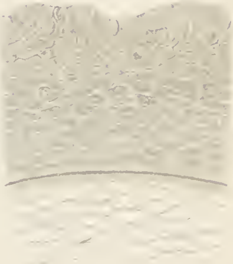


Fig 3. $^1_2$

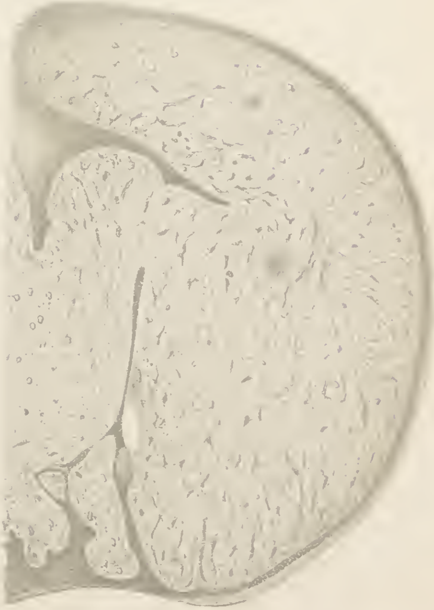


Fig 1b $^2_7$

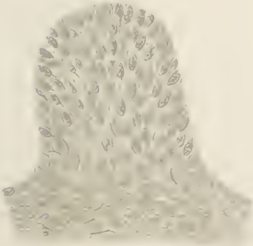


Fig. 4. $^{3}_{2}$

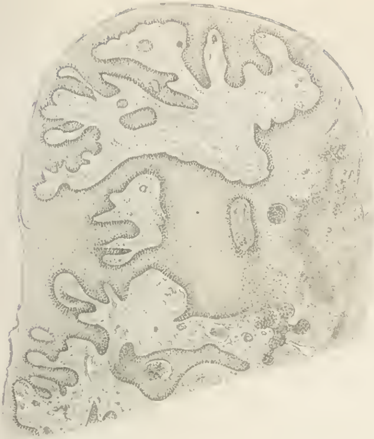


Fig. 5. 2

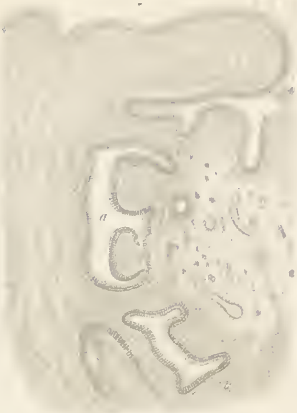


Fig. 6.a $^{3}_{8}$

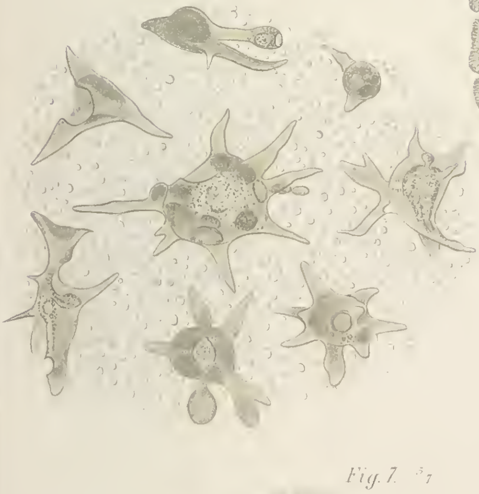


Fig. 6 $^{3}_{2}$

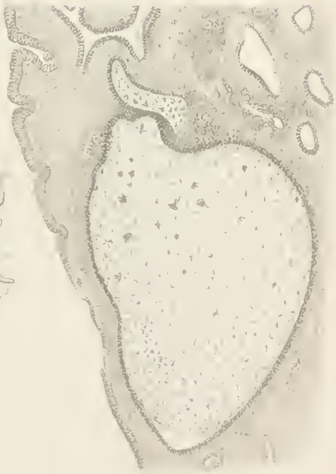


Fig. 7. $^{3}_{7}$

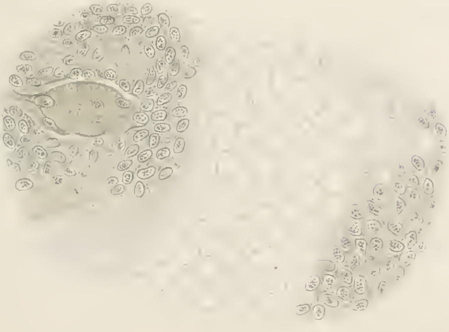


Fig. 8

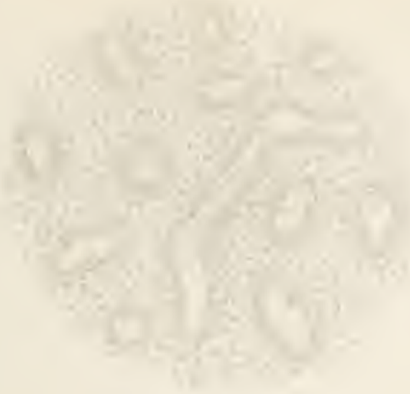


Fig. 9

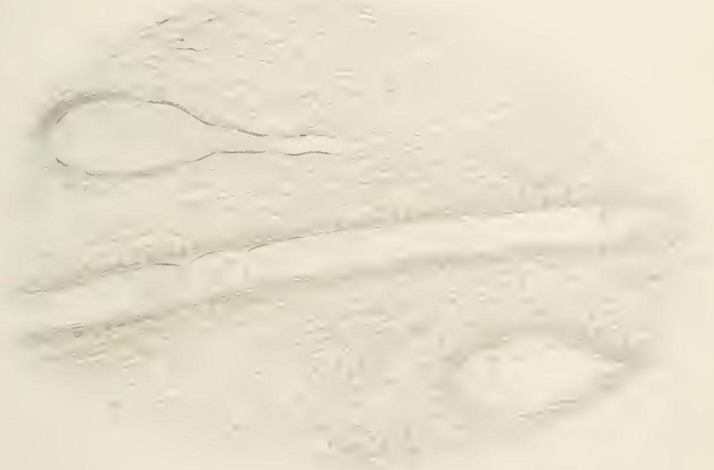


Fig. 10

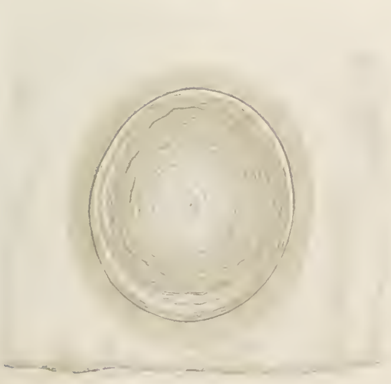
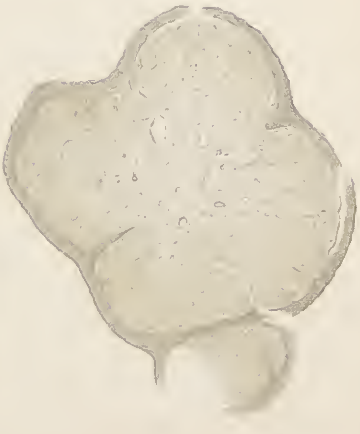


Fig. 11



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